1-1-2005

The conservation of crop genetic diversity in Turkey : an analysis of the linkages between local, national and international levels.

Zuhre, Aksoy
University of Massachusetts Amherst

THE CONSERVATION OF CROP GENETIC DIVERSITY IN TURKEY: AN ANALYSIS OF THE LINKAGES BETWEEN LOCAL, NATIONAL AND INTERNATIONAL LEVELS

A Dissertation Presented

by

ZUHRE AKSOY

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

February 2005

Political Science

THE CONSERVATION OF CROP GENETIC DIVERSITY IN TURKEY: AN ANALYSIS OF THE LINKAGES BETWEEN LOCAL, NATIONAL AND INTERNATIONAL LEVELS

A Dissertation Presented

by

ZUHRE AKSOY

Approved as to style and content by:

Peter M. Haas, Chair

Craig W. Thomas, Member

James K. Boyce, Member

M. J. Peterson, Department Head
Department of Political Science

DEDICATION

To my parents Seza and Babür

ACKNOWLEDGMENTS

First and foremost, I would like to express my gratitude to my advisor, Peter M. Haas, for his guidance and continuous support throughout this study, and thank with all my heart Craig W. Thomas and James K. Boyce, for their encouragement, invaluable comments and advice. I am indebted to them for their contribution in every stage of this study. I would also like to thank all the members of the Environmental Working Group, directed by James K. Boyce, for the productive discussions.

I am grateful to all the farmers, scientists, government officials, and NGO representatives who agreed to interviews during my research in Turkey. For 2002-2003, with the Joseph L. Fisher Dissertation Award, Resources for the Future provided me the opportunity to focus on writing my dissertation, so my thanks also go to them. I would also like to thank Ertuğ Fırat and Ayfer Tan of the Aegean Agricultural Research Institute, and Ömür Can, Ismail Kara and Ramis Dayıoğlu of the Anatolian Agricultural Research Institute for their coordination and collaboration for the field work in Eskişehir.

I dedicate this dissertation to my parents, Seza and Babür Aksoy, whose love has always given me courage and strength. My brother Yunus Aksoy has always been my friend, and my guide in life. Throughout my journey as a graduate student, my friends, Lena Tan, Burak Bener, and Armağan Gezici were always with me. Last, I would like to thank Değer Eryar for his companionship and support in every stage throughout this process.

ABSTRACT

THE CONSERVATION OF CROP GENETIC DIVERSITY IN TURKEY: AN ANALYSIS OF THE LINKAGES BETWEEN LOCAL, NATIONAL, AND INTERNATIONAL LEVELS

FEBRUARY 2005

ZUHRE AKSOY, B.A., BOGAZICI UNIVERSITY

M.A., UNIVERSITY OF MASSACHUSETTS AMHERST

Ph.D., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor Peter M. Haas

The rapid loss of biological diversity is a major global environmental problem. This dissertation analyzes the conservation of crop genetic diversity, a particularly important component of global biodiversity, within a framework of multi-scale linkages. It examines the impact of international institutions and regimes on national and local-level practices, and the implications of local-level practices on higher levels of social organization. To illustrate these linkages, the dissertation examines the case Turkey, the historic center of origin and modern center of diversity of several key crops, including wheat and barley. The dissertation analyzes the interplay between two different international frameworks: the biodiversity institution/regime represented by the Convention on Biological Diversity (CBD), to which Turkey is a party, and the neoliberal economic institution/regime promoted by the International Monetary Fund (IMF) and the World Bank, whose prescriptions shape national agricultural policies through stabilization and structural adjustment programmes.

In line with the constructivist approach in international relations theory, the dissertation argues that the CBD has played a crucial role in providing the space and

institutionalized channels for scientific input to be incorporated into the domestic policy-making process for the conservation of biological diversity. The diffusion of the policy innovations at the local level has been circumscribed significantly, however, by the agricultural priorities of the government which in turn were influenced strongly by the agricultural liberalization process directed by the IMF and assisted by the World Bank. Field research in two wheat-growing regions of Turkey reveals that the cultivation of modern and traditional varieties can co-exist, suggesting that there is no inherent contradiction between the conservation of crop genetic resources and the promotion of agricultural growth and productivity. This research also reveals the importance of social capital in the conservation of crop genetic diversity. The dissertation concludes that public agencies can play a critical role in the provision of mechanisms to ensure that conservation of crop genetic diversity will meet the needs of rural communities.

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION: THE CONSERVATION OF BIOLOGICAL DIVERSITY AND CROP GENETIC RESOURCES

1.1 Introduction

In a discussion of the evolution of international environmental governance, Peter M. Haas underlines that since the 1972 United Nations Conference on the Human Environment (UNCHE), a stable set of expectations about reciprocal state practice has been established, and its form has "evolved over time to become more comprehensive, reflecting growing scientific understanding about the behavior of ecosystems and the sensitivity of human societies to such dynamics".[1]

The conservation and management of plant genetic resources have been a significant issue with the international recognition of the threats to biological diversity and the increase in economic benefits from exploitation of natural resources through advances in biological technologies. Crop genetic diversity, as part of a more general conception of global biodiversity, is crucial for long term food security, as it provides the raw material needed for future crop adaptations to changing pests, pathogens, and environmental conditions. Landraces, or traditional varieties, cultivated by farmers for generations, provide the most significant component of the world's crop genetic

[1] Peter M. Haas, "Social Constructivism and the Evolution of Multilateral Environmental Governance" in Globalization and Governance, Aseem Prakash and Jeffrey A. Hart, eds. (London; New York: Routledge, 1999), 103-133.

resources.[2] As all modern crops are derived from landraces, their cultivation at the local level has global implications.

This dissertation analyzes the conservation of crop genetic diversity within a framework of multi-scale linkages. It focuses on the role of international institutions/regimes[3] on national and local level practices, and the implications of local level practices on higher levels of social organization. Diversity of crop genetic resources is concentrated in locations where crops were originally domesticated and/or evolved, and these locations are known as Vavilov Centers, after the Russian botanist who pioneered the study of crop origins.[4] The dissertation analyzes linkages between

---

[2] A landrace can be defined as "a population of plants, typically genetically heterogeneous, commonly developed in traditional agriculture from many years of farmer directed selection, and which is specifically adapted to local conditions." See National Research Council NRC, 1993. National Research Council (NRC), Crop Diversity: Institutional Responses in Managing Global Genetic Resources: Agricultural Crop Issues and Politics, (Washington DC: National Academy Press, 1993). From here on, landraces and traditional varieties will be used interchangeably.

[3] Robert O. Keohane, Peter M. Haas, and Marc A. Levy define institutions as "persistent and consistent sets of rules and practices that prescribe behavioral roles, constrain activity and shape expectations. They may take the form of bureaucratic organizations, regimes (rule structures that do not necessarily have organizations attached), or conventions (informal practices)." Robert O. Keohane, Peter M. Haas and Marc A. Levy, "The Effectiveness of International Environmental Institutions" in Institutions for the Earth: Sources of Effective International Environmental Protection, Peter M. Haas, Robert O. Keohane and Marc A. Levy, eds. (Cambridge, Mass.: The MIT Press, 1993), 4-5. A sub-group of institutions, international regimes, are defined as "implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given issue-area." Stephen D. Krasner, "Structural causes and regime consequences: regimes as intervening variables," International Organization, 36, 2, (1982): 185-204, p.185. Please see section 2.2. for a discussion of institutions and regimes.

[4] Stephen B. Brush, "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity" in Natural Assets: Democratizing Environmental Ownership, James K. Boyce and Barry Shelley, eds. (Washington DC: Island Press, 2003), 187-205.

different levels in the conservation of genetic resources and diversity in the case of Turkey, a center of origin and diversity of several crop plants (such as wheat and barley), as well as one of the domestication centers where ancient agriculture started. Two of Vavilov's centers of origin, namely, Near Eastern and Mediterranean Centers, are located in Turkey. For example, Alptekin Karagöz and Nusret Zencirci note that Southeast Anatolia is known as primary center of wheat diversification and the area of first wheat domestication, and since the beginning of 20th century, variation in Turkish wheat has received great attention.[5] Landraces and wild relatives of crops from Turkey continue to provide new sources of important traits needed to maintain and improve agricultural production and efficiency worldwide.[6]

The research question the dissertation addresses is: What are the factors that affect the conservation and evolution of crop genetic diversity by farmers at the local level? In terms of the linkages between factors at different levels, a related question is: How do international and national institutions/regimes affect the capabilities of farmers at the local level to conserve crop genetic diversity? At the international level, the dissertation is looking at two different institutional frameworks, namely the Convention on Biological Diversity (CBD), and the neoliberal economic institution/regime fostered by the International Financial Institutions, namely, the International Monetary Fund (IMF) and the World Bank, which direct national agricultural policies towards

---

[5] Alptekin Karagöz and Nusret Zencirci, "Variation in wheat (Triticum spp.) landraces from different altitudes of three regions in Turkey," Genetic Resources and Crop Evolution, (forthcoming 2004).

[6] Ertug Fırat and Ayfer Tan, "Turkey Maintains Pivotal Role in Global Genetic Resources," Diversity 11, 1&2, (1995): 61-63.

liberalization through arrangements such as stabilization and structural adjustment programmes. Turkey is a party to the CBD. It has also been in a process of agricultural restructuring towards liberalization, which started in the1980s, and accelerated after the February 2001 economic crisis under IMF supervision and World Bank (WB) assistance. This makes Turkey a promising case for analyzing the linkages between different level factors.

1.2. The Conservation of Biological Diversity: A Global Public Good

Biological diversity can be defined as the diversity of genes, species, and ecosystems, corresponding to three fundamental and hierarchically related levels of biological organization. Biodiversity loss, in the form of genetic erosion, loss of species and habitats, can cause unanticipated harm for entire ecosystems.[7] Charles Perrings and Madhav Gadgil emphasize that biodiversity loss at any level diminishes the world's gene pool –an intergenerational global public good--, which comprises the genetic information contained in the set of species on Earth as well as the information that may be provided in the future through the evolution of those species.[8] Genetic diversity is significant as it provides the raw material of evolution and because it enables adaptation

[7] Kal Raustiala, "Domestic Institutions and International Regulatory Cooperation: Comparative Responses to the Convention on Biological Diversity," World Politics 49, 4 (1997): 482-509.

[8] Charles Perrings and Madhav Gadgil, "Conserving Biodiversity: Reconciling Local and Global Public Benefits," in Providing Global Public Goods: Managing Globalization, Inge Kaul, Pedro Conceicao, Katell Le Goulven, Ronald U. Mendoza, eds. (New York: Published for the United Nations Development Programme [by] Oxford University Press, 2003), 532-555.

and change in organisms.[9] The Global Biodiversity Outlook indicates that high levels of genetic diversity should allow species to be flexible in the face of environmental change, whereas low genetic diversity tends to increase the risk of extinction.

Perrings and Gadgil note that changes in land use affect biodiversity in both managed systems and their ecological hinterlands. In a discussion of agroecosystems, they underline that market induced specialization, animal and plant selection, and modern plant and animal breeding have narrowed the genetic base of agriculture to the extent where only handful of species provide most of the global food supply: wheat, rice, corn, oats, sorghum, plantains, tomatoes, potatoes, cattle sheep, pigs, chickens. In addition, within each of these species there has been a substantial loss of genetic diversity.[10] The causes of genetic erosion mentioned in the country reports to Food and Agriculture Organization (FAO) include replacement of local varieties, land clearing, overexploitation of species, population pressure, environmental degradation, overgrazing and changing agricultural systems.[11]

For example, in China, in 1949, nearly 10,000 wheat varieties were used in production, by the 1970s, only about 1,000 varieties remained in use, and in Ethiopia, traditional barley and durum wheat varieties are suffering serious genetic erosion

---

[9] Global Biodiversity Outlook, Secretariat of the Convention on Biological Diversity, Montreal, 2001.

[10] Charles Perrings and Madhav Gadgil, "Conserving Biodiversity: Reconciling Local and Global Public Benefits," in Providing Global Public Goods: Managing Globalization, Inge Kaul, Pedro Conceicao, Katell Le Goulven, Ronald U. Mendoza, eds. (New York: Published for the United Nations Development Programme [by] Oxford University Press, 2003), 532-555.

[11] Food and Agriculture Organization of the United Nations, The State of the World's Plant Genetic Resources for Food and Agriculture (Rome, 1998).

because of displacement by introduced varieties.[12] Genetic erosion in Mexico is documented by the data that only 20 % of the local varieties reported in 1930 are known today because of decreases in the area of land planted with maize and the replacement of maize with other more profitable crops, and in the country report to FAO, Turkey indicates that adoption of new cultivars, nitrogenous fertilizer, and increasing commercialization in agriculture have reduced the area of local crop production.[13]

The Convention on Biological Diversity (CBD), which was opened to signature at the United Nations Conference on Environment and Development (UNCED) in 1992, and entered into force on 29 December 1993, is a landmark in the environment and development field, argues Michel Pimbert.[14] Lee Kimball notes that the CBD is arguably the most all-encompassing international agreement ever adopted, it seeks to conserve the diversity of life on earth at genetic, population, species, habitat, and ecosystem levels and to ensure its role in maintaining the life support systems of the biosphere.[15]

As such, the CBD, for the first time ever, Pimbert argues, adopts a comprehensive rather than sectoral approach to the conservation and sustainable of the Earth's biological diversity. The Convention recognizes, in the face of many remaining

---

[12] Ibid.

[13] Ibid.

[14] Michel Pimbert, "Issues Emerging in Implementing the Convention on Biological Diversity," Journal of International Development 9, 3 (1997): 415-425.

[15] Lee Kimball, "Institutional Linkages Between the CBD and Other International Conventions," RECIEL 6, 3 (1997): 239-248.

uncertainties, the inter-species and environmental interactions which contribute to functioning systems, the need for healthy space to allow species and ecosystems to adapt to environmental change, and the role that resilient ecosystems play in the global systems and cycles.[16] The CBD is regarded as a framework convention, even though it does not contain the term framework in its formal title.[17] Desiree McGraw underlines that the CBD is a framework convention in three important ways. First, it creates a global structure to promote continued international cooperation and to support national implementation, emphasizing national action relating to biodiversity within state jurisdictions, establishing a framework of general, flexible obligations that parties may apply through national laws and policies. Second, through the negotiations of annexes and protocols, the Convention allows for its further development.[18] Lastly, the CBD, unlike an umbrella convention which absorbs related treaties, builds upon existing agreements. It adopts a broad ecosystem approach to conservation, building a wider context for the protection of biological diversity, whereas previous biodiversity instruments target specific species, sites and activities.

The objectives of the Convention are the conservation of biological diversity, sustainable use of its components, and the fair and equitable sharing of the benefits

---

[16] Ibid.

[17] Desiree McGraw, "The CBD: Key Characteristics and Implications for Implementation," RECIEL 11, 1 (2002): 17-28.

[18] Ibid. McGraw also notes that the contemporary 'framework-protocol' approach to multilateral environmental treaty making has proven effective in transforming the often ambiguous and soft 'legal' content of environment and/or sustainable development conventions into more precise and binding provisions.

arising out of the utilization of genetic resources.[19] One striking feature of the CBD, as McGraw emphasizes, is that it reflects concessions secured by developing countries, which they had been unable to do in negotiations for other multilateral agreements, trade, security, or environmental issues such as climate change.[20] While the major bulk of the world's terrestrial species is found in tropical forests of the South, it is mainly the developed countries of the North who possess the technological and economic capacity to reap the benefits from the genetic variability used in the agribusiness and pharmaceutical companies.[21] The developing countries were successful in securing sovereign rights over the biological resources within their borders, and as a result, the attempts by powerful state and non-state actors to create a convention aimed merely at conserving biodiversity were thwarted.[22] As such, Kimball notes, the conservation of biodiversity is complemented by social and economic objectives for the use of biological resources and benefits derived from genetic resources.[23]

---

[19] The Convention on Biological Diversity, Article1: Objectives.

[20] Desiree McGraw, "The CBD: Key Characteristics and Implications for Implementation," RECIEL 11, 1 (2002): 17-28.

[21] Kristin Rosendal, "Interacting International Institutions: The Convention on Biological Diversity and TRIPs- Regulating Access to Genetic Resources," Paper presented at 44th Annual Convention of International Studies Association, Portland Oregon, 2003.

[22] Desiree McGraw, "The CBD: Key Characteristics and Implications for Implementation," RECIEL 11, 1 (2002): 17-28.

[23] Lee Kimball, "Institutional Linkages Between the CBD and Other International Conventions," RECIEL 6, 3 (1997): 239-248.

1.3. The Conservation of Crop Genetic Diversity

Most centers of genetic diversity in agriculture and plant domestication are in developing countries. Farmers, for generations, have nurtured landraces, and ultimately all modern crops are derived from landraces, although the complexity of transformations between landraces and modern cultivars may differ from crop to crop.[24] Landraces are the genetically variable populations that respond differently to different soil conditions, levels of moisture, temperature, sunlight, diseases and pests, microclimates.[25] Over time, James C. Scott points out, traditional cultivators, operating as experienced applied botanists, have developed literally thousands of landraces of a single species, and a working knowledge of many of these landraces provided cultivators with enormous flexibility in the face of environmental factors that they could not control.[26] The genetic variability of the crops they grew provided some of the built-in insurance against drought, plant diseases, pests, and the seasonal vagaries of climate, as a pathogen may affect one landrace but not another, some landrace would do well in drought but the other might not.[27]

1.3.1. Ex situ and In situ Conservation

The importance of the complementarity between *in situ* (on-site or in the field) and *ex situ* (off-site) conservation of plant genetic diversity has frequently been

---

[24] Stephen B. Brush, "Bio-Cooperation and the Benefits of Crop Genetic Resources: The Case of Mexican Maize," World Development 26, 5 (1998): 755-66.

[25] James C. Scott, Seeing Like a State (New Haven: Yale University Press, 1998).

[26] Ibid.

[27] Ibid.

underlined by authors writing about plant genetic diversity.[28] For example, Harrison Wilkes notes that while the largest gene pool is found in the "silently shrinking landraces and folk varieties of indigenous and peasant agriculture", the centers of diversity for crop plants have increasingly become mega-gene bank storage facilities.[29] The Consultative Group on International Agricultural Research (CGIAR) is the body of network of international agricultural research centers including the International Maize and Wheat Improvement Center (CIMYYT) in Mexico and International Rice Research Institute (IRRI) in the Philippines. These centers have been major collectors and storage sites for germplasm and played a key role in breeding of new varieties of crops. They make germplasm available to national public institutions and to private plant breeders.[30] Despite the fact that gene banks give plant breeders access to germplasm and provide insurance against losses of *in situ* diversity[31], there are a number of problems associated with them, partly due to problems of limited funding, and partly due to the nature of

---

[28] As Stephen B. Brush notes, *ex situ* conservation refers to maintenance of genetic resources in gene banks, botanical gardens, and agricultural research stations, and *in situ* conservation refers to maintenance of genetic resources on farm or in natural habitats. Stephen B. Brush, "The Issues of *In Situ* Conservation of Crop Genetic Resources," in Genes in the Field: On-farm Conservation of Crop Diversity, Stephen B. Brush ed. (Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000), 1-28.

[29] Harrison G. Wilkes, "Strategies for Sustaining Crop Germplasm Preservation, Enhancement and Use," Issues in Agriculture, 5, CGIAR, (1992).

[30] George B. Frisvold and Peter T. Condon, "The Convention on Biological Diversity and Agriculture: Implications and Unresolved Debates," World Development 26, 4 (1998): 551-570.

[31] James K. Boyce, "Ecological Distribution, Agricultural Trade Liberalization, and *In Situ* Genetic Diversity," Journal of Income Distribution 6, 2 (1996): 265-286.

their conservation strategy. George Frisvold and Peter Condon note that while there has been significant emphasis on collecting materials, less attention has been given to maintaining the viability of accession over the long term. Most gene banks lack long-term storage facilities, and even accessions in long term storage can not be maintained indefinitely.[32]

Seeds need to be periodically regenerated by planting to harvest new seed. When viability falls below 85 % of its initial value, samples should be regenerated, yet several countries state that they cannot comply with this general international standard. The major problem is lack of funds, facilities, or trained staff to carry out needed regenerations.[33]

In a brainstorming session on Crop Genetic Diversity and Rural Livelihoods held in Mexico in 2001, it was underlined that *ex situ* collections are too small. As new germplasm is being constantly generated, there is "a lot more genetic diversity present in the fields than the existing gene banks are capable of maintaining. Despite this shortfall, genebanks are currently *decreasing* the size of their collections."[34]

---

[32] George B. Frisvold and Peter T. Condon, "The Convention on Biological Diversity and Agriculture: Implications and Unresolved Debates," World Development 26, 4 (1998): 551-570.

[33] Ibid.

[34] Minutes of the Chiapas Meeting on Crop Genetic Diversity and Rural Livelihoods, June 28-30, 2001. (http://www.umass.edu/peri/programs/development/cropdiversity.htm) July 12, 2004.

The FAO reports in State of the world's plant genetic resources for food and agriculture (FAO, Rome, 1998) that according to the WIEWS database, about half of all ex situ accessions (48 %) for which the type of material is known are advanced cultivars or breeders lines, while just over one third are landraces or old cultivars and about 15 % are wild or weedy plants or crop relatives. However, one caveat is that these estimates are subject to wide error as the type of accession is known only definitively for a third of all accessions. More complete data are available on the base collections in CGIAR gene banks. As shown below, CGIAR base collections contain 59 % landraces and old cultivars, 14 % wild and weedy relatives and 27 % advanced cultivars and breeders lines. However, these aggregate figures differ widely from centre to centre, as well as for different crops held in the same centre. For example, CIMMYT's wheat collection contains more than 50 % advanced cultivars and breeding lines, but the maize collection contains almost exclusively landraces, old cultivars, and wild and weedy relatives. In private collections, advanced cultivars make up 75 % of accessions for which the type is known, landraces account for 15 % and wild species 10 % of accessions. National gene banks hold more than 80 % of total collections, as such the situation in national collections illustrates the situation worldwide. In these collections, approximately half the accessions for which the type of material is known are advanced cultivars and breeders lines, while a third are landraces, and about 10 % are wild species.

Types of accessions in *ex situ* collections:

GOVERNMENTAL

Advanced:	18 %
Advanced/landraces:	12 %
Landraces:	12 %
Wild species:	4 %
Others and mixed:	54 %

Consultative Group on International Agricultural Research (CGIAR) base collections:

Advanced:	27 %
Wild species:	14 %
Landraces:	59 %

Private:

Advanced:	47 %
Advanced/landraces:	3 %
Landraces:	9 %
Wild species:	6 %
Others and mixed:	35 %

[1] WIEWS is Food and Agriculture Organization (FAO)'s World Information and Early Warning System on Plant Genetic Resources

[1] CIMMYT is the Centre for Maize and Wheat Improvement located in Mexico, one of the international agricultural research centres of the CGIAR system.

Source: FAO State of the World's Plant Genetic Resources for Food and Agriculture (Rome, 1998).

Figure 1.1. Ex Situ Collections

However, one point that should be emphasized is that even if all these problems could be overcome, gene banks by themselves cannot be adequate for conservation and particularly evolution of plant genetic diversity. "The ongoing process of evolution, which created this diversity and continues to generate a flow of new varieties, can not be stored; it can happen only in the field."[35] James K. Boyce also notes that the information problem is a further limitation of *ex situ* collections to be regarded as a substitute for *in situ* conservation, the knowledge of the agronomic properties of these varieties can only be ascertained in the field, as such, the knowledge of the farmers themselves are the 'bank' for this information. Hence, while gene banks are crucial, they should be seen as a complementary strategy to *in situ* conservation and evolution of genetic diversity, and not as a substitute.

Crop genetic diversity yields an array of benefits by contributing to productivity, resilience in farming systems, income generation, nutritional values, and providing ecosystem services on farm, including pollination, fertility and nutrient enhancement, insect and disease management.[36] Farmers engaging in traditional agricultural practices producing landraces provide positive externalities by conservation evolution of *in situ* diversity in crop plants. Public goods are typically underproduced, and this underproduction is significant even in the context of the nation state which is bound by some social contract and directed in public matters by a government with the power to

---

[35] James K. Boyce, "Ecological Distribution, Agricultural Trade Liberalization, and *In Situ* Genetic Diversity," Journal of Income Distribution 6, 2 (1996), 272.

[36] Lori Ann Thrupp, "Linking Agricultural Biodiversity and Food Security: The Valuable Role of Agrobiodiversity for Sustainable Agriculture," International Affairs 76, 2, (2000): 265-281.

impose and collect taxes.[37] Stephen B. Brush notes that today, the primary stewards of crop genetic resources in centers of diversity, which continue to provide the basis for agricultural development around the world are poor farmers, yet, these genetic resources are threatened by the economic marginalization of poor farmers, by the competitive disadvantage of traditional crops compared to modern industrial agriculture.[38] "Genetic erosion—the loss of biodiversity and resources—is being caused by the replacement of local varieties with improved ones or with different crops altogether and by the exodus of farmers to non-farm employment."[39]

Where inefficiencies in agricultural production are associated with natural diversity, industrial agricultural processes overcome these by developing highly mechanized, high-input, and regulated processes.[40] Scott underlines that modern, industrial farming, which is characterized by monocropping, mechanization, hybrids, the use of fertilizers and pesticides, and capital intensiveness has brought standardization, and one of the basic sources of increasing uniformity in crops arises

---

[37] Charles Kindleberger, "International Public Goods without International Government," American Economic Review, 76 (1986): 1-13.

[38] Stephen B. Brush, "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity" in Natural Assets: Democratizing Environmental Ownership, James K. Boyce and Barry Shelley, eds. (Washington DC: Island Press, 2003), 187-205.

[39] Ibid, 188.

[40] Douglas Bardsley "Risk Alleviation via In Situ Agrobiodiversity conservation: drawing from experiences in Switzerland, Turkey and Nepal," Agriculture, Ecosystems and Environment 99 (2003): 149-157.

from the intense commercial pressures to maximize profits in a competitive mass market.[41]

In analyzing individual actions, one approach is to emphasize economic rationality, which sees utility maximization, or the efficient promotion of interests at the center of all actions. In his discussion of farmer behavior, Ilter Turan notes the observation by Ortiz in Colombia that farmers distinguish between those activities which are guided by subsistence considerations and those which relate to the market.[42] Turan argues that maximizing gains requires taking risks, yet, by remaining loyal to time-tested ways, the farmers may be foregoing higher gains, but at the same time, they are avoiding high risks. Douglas Bardsley notes that in agroecosystems in mountainous regions reflect large variations in agro-ecological conditions, and that rural communities in mountainous regions of Nepal and Turkey respond to agroecological risk by ensuring that diversity remains integrated within their production methods. Despite their low yields, landraces are cultivated since they give reliable yields, or they can be re-sown in the spring if the crop fails, whereas modern varieties can not. In contrast to the approach that emphasizes only economic rationality, Paul Clements and Emily Hauptmann argue that it is not only the rational capacity but also reasonable capacity which is fundamental to political and social reasoning, and reasonable capacity refers to senses

---

[41] James C. Scott, Seeing Like a State (New Haven: Yale University Press, 1998).

[42] S. Ortiz, "Reflections on the concept of peasant culture and peasant cognitive systems," in Teodor Shanin (ed.) Peasants and Peasant Societies; selected readings (Middlesex, Penguin Books, 1971), quoted in Ilter Turan, "Policymakers' Assumptions about Peasant Society: Myth or Reality," Policy Studies Review 4, 1 (1984): 99-109.

of justice, fairness, and appropriateness.[43] "In contrast to maximizing across a schedule of preferences, these senses operate in the manner of application of a principle or rule."[44] An approach that takes into account both the rational and reasonable capacities enables a vision of network of principles of social organization.

The neo-classical approach to agricultural development encourages the withdrawal of the state from interference in the market governance of production systems.[45] As Jonathan Carlson underscores, the International Financial Institutions, the IMF and the World Bank, under current policies, have aimed to impress upon developing states the importance of markets and the deleterious effects on development of excessive state regulation or involvement in the economy.[46] Both these institutions, as well as the World Trade Organization, Carlson notes, have had success in orienting the developing states towards liberalization of laws affecting international flows of goods and capital.

Brush underlines that threats to traditional agricultural knowledge accompany restructuring in the national agricultural sector, and specific changes in local farming systems. At the national level, systemic changes include integration of local farming

---

[43] Paul Clements and Emily Hauptmann, "The Reasonable and Rational Capacities in Political Analysis," Politics and Society 30, 1 (2002): 85-111.

[44] Ibid, 90.

[45] Douglas Bardsley "Risk Alleviation via In Situ Agrobiodiversity conservation: drawing from experiences in Switzerland, Turkey and Nepal," Agriculture, Ecosystems and Environment 99 (2003): 149-157.

[46] Jonathan C. Carlson, "Strengthening the Property Rights Regime for Plant Genetic Resources: The Role of the World Bank," Transnational Law and Contemporary Problems 6, 1 (1996): 91-122.

systems into national and international flows of inputs and commodities, capital substitution for land and labor inputs, market allocation of land and labor, as well as decline in the percentages of people who depend on agriculture for their livelihoods.[47] He argues that the social value of traditional agricultural knowledge is highest for farmers, and a second social value of traditional agricultural knowledge is in maintaining crop diversity and crop evolutionary processes *in situ*.

The CBD puts the emphasis on *in situ* conservation of genetic resources. Reconciling private and social values across national boundaries, and across highly contrasting social and economic groups has been central to international efforts to staunch the loss of biological diversity.[48] The CBD, Brush emphasizes, aims at such reconciliation, representing a step toward a negotiated settlement between parties who manage genetic resources and parties interested in their conservation. Perrings and Gadgil note that while international agreements are significant for the international coordination of conservation efforts and for the provision of national incentives to protect the global gene pool, national policies are essential to link countries to international frameworks to foster national cooperation and fairness.[49] Yet, they argue,

---

[47] Stephen B. Brush, "The Demise of 'Common Heritage' and Protection for Traditional Agricultural Knowledge," Paper presented at Conference on Biodiversity, Biotechnology, and the Protection of Traditional Knowledge, St. Louis, MO, 2003.

[48] Stephen B. Brush, "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity" in Natural Assets: Democratizing Environmental Ownership, James K. Boyce and Barry Shelley, eds. (Washington DC: Island Press, 2003), 187-205.

[49] Charles Perrings and Madhav Gadgil, "Conserving Biodiversity: Reconciling Local and Global Public Benefits," in Providing Global Public Goods: Managing Globalization, Inge Kaul, Pedro Conceicao, Katell Le Goulven, Ronald U. Mendoza, eds. (New York: Published for the United Nations Development Programme [by] Oxford University Press, 2003), 532-555.

international and national frameworks will achieve little unless biodiversity conservation makes sense locally, in the context of local ecosystems and people's lives. For the conservation efforts they undertake in the national, regional and global interest, local communities must be fairly rewarded, and those conservation efforts must be consistent with the protection of local public goods.

As such, the conservation of crop genetic diversity presents an excellent case for analyzing linkages between different scales of social organization in environmental governance, namely, the local, national and international levels, which is the aim of this dissertation. At this point, one important question is how do international and national institutions/regimes affect the conservation and evolution of crop genetic diversity by the farmers at the local level? The dissertation will address this question by looking at the implementation process of the CBD in Turkey, a country of origin and/or diversity of several crop species, including wheat and barley.

1.4. Status of Plant Genetic Diversity in Turkey

Turkey is the genetic center, or diversity center for a large number of plants, and there are approximately 9,000 plant species in Anatolia, 3,000 of which are endemic.[50] As indicated earlier, two of Vavilov's Centers of origin, namely, Near Eastern and Mediterranean Centers, extend into Turkey, making Turkey one of the centers of origin

---

[50] Aykut Kence, Biological Diversity in Turkey (Ankara, EPFT Publications, 1987). Europe has approximately 12,000 species and 2750 endemics. This comparison, Fırat and Tan note, underscores the floristic potential of Turkey. Ertug Fırat and Ayfer Tan, "Turkey Maintains Pivotal Role in Global Genetic Resources," Diversity 11, 1&2, (1995): 61-63.

and centers of diversity of several crop plants and many plant species[51]. Throughout the process of adaptation of crop plants to varying climatic and topographical regions in Turkey, cultivated plants have responded to natural selections as well as selection of farmers, which resulted in the "tremendous variability in landraces in various Turkish provinces".[52] Turkey is the center of diversity, or micro-gene center, as well as site of domestication for many temperate agricultural crops, including wheat, barley, chickpea, faba bean and vetch.[53] Through human agency, Ertug Fırat and Ayfer Tan add, some cultivated plants have become more widespread and accordingly increased their variability, and this has made Turkey a secondary center of diversity for some cultivated crops, including cucumber, lentil, apples, pistachio, pea etc.[54] This rich genetic diversity is significant for plant breeding programs, as landraces are used to improve varieties. Many registered varieties are released from the plant genetic collections.[55]

---

[51] Ayfer Tan, "Current Status of Plant Genetic Resources Conservation in Turkey," in Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity, N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. (Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998), 5-16.

[52] Ertug Fırat and Ayfer Tan, "Turkey Maintains Pivotal Role in Global Genetic Resources," Diversity 11, 1&2, (1995): 61-63. They note that the selection of farmers may be unconscious.

[53] Ertug Fırat and Ayfer Tan, "*In Situ* Conservation of Genetic Diversity in Turkey," in Plant Genetic Conservation: The In Situ Approach, Nigel Maxted, Brian Ford-Lloyd, and John Gregory Hawkes , eds. (London; New York: Chapman & Hall, 1997).

[54] Ertug Fırat and Ayfer Tan, "Turkey Maintains Pivotal Role in Global Genetic Resources," Diversity 11, 1&2, (1995): 61-63.

[55] Ayfer Tan, "Agricultural Plant Diversity in Turkey" Paper presented to the OECD Expert Meeting on Agri-Biodiversity Indicators, Zurich, Switzerland, 2001.

Table 1.1. Number of Registered Varieties in Turkey

Crops	1963-84	1985-2000
Cereals	124	209
Fodder crops	24	34
Grapes		4
Fruits		45
Industrial crops	74	127
Oil seeds	4	95
Pulses	20	39
Root crops (potato)	17	38
Vegetables	75	95

Source: (Ayfer Tan, 2001).

However, genetic diversity in Turkey is decreasing due to a number of factors, including population increase; the increasing cultivation of modern varieties of seeds (replacing landraces with higher genetic diversity); industrialization, increased use of new land in modern agriculture; among others.[56] Tan underlines that despite some positive aspects of the change that some of the regions in Turkey are undergoing in terms of trade, exports, urbanization and market driven farming, these at the same time have contributed to loss of biological diversity as well as agrobiodiversity.[57]

As noted earlier, losses of diversity can occur by three main processes: first, by the replacement of local varieties with improved ones, second, replacement of these crops with different crops altogether, third, by migration of the farmers from rural areas

[56] Murat Ozgen, Sait Adak, Alptekin Karagöz, and Hakan Ulukan, "Bitkisel Gen Kaynaklarının Korunma ve Kullanımı" (The Conservation and Use of Plant Genetic Diversity), Türk Tarım Kongresi, 1995.

[57] Ayfer Tan, "Current Status of Plant Genetic Resources Conservation in Turkey," in Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity, N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. (Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998).

to towns and cities and pursue non-farm employment. The farmers' practices of cultivating landraces are linked to national agricultural processes, which in turn can be shaped by international economic institution/regime embodied by International Financial Institutions, the IMF and World Bank. In the Turkish context, since the 1980s, a process of market-oriented agricultural restructuring has been under way, and this process dramatically gained momentum after the economic crisis in 2001, with IMF direction and World Bank assistance. It is important to analyze the impact of agricultural liberalization in Turkey with regard to these three processes by which diversity loss can occur.

Today, agriculture continues to be a very significant sector in Turkey, as it employs 45 per cent of the labor force, and the share of agriculture in total the GDP is around 13 per cent. The focus of this dissertation will be on wheat production, since wheat is Turkey's leading agricultural commodity. Turkey is among the 10 largest wheat producers worldwide, and the food consumption figures of Turkey for 2000-2002 indicate that wheat and wheat products comprise 44 per cent of the total dietary energy supply.[58] Bread is the most important food in the Turkish diet, as it makes up approximately 74 % of wheat consumption.[59] In the cities, bread wheat is mainly

---

[58] See Hans-Joachim Braun, Nusret Zencirci, Fahri Altay, Ayhan Atlı, Muzaffer Avcı, Vehbi Eser, Mesut Kambertay, and Thomas S. Payne, "Turkish Wheat Pool," in The World Wheat Book: A History of Wheat Breeding, Alain P. Bonjean and William J. Angus eds. (Paris: Lavoisier Publishing, 2001): 851-879. For the food consumption figures, see Food and Agriculture Organization (2004), Compendium of Food and Agriculture Indicators-2004.

[59] N. Zencirci, E. Kinaci, A. Atli, M. Kalayci and M. Avci (1998) "Wheat Research in Turkey," in Wheat: Prospects for Global Improvement. Developments in Plant Breeding, v.6. Hans-Joachim Braun, Fahri Altay, Warren E. Kronstad, Surendra P.S.

consumed as leavened bread, and as flat bread in villages.[60] Accordingly, the government has long intervened in the wheat sector with the justification based on the need to ensure food security for the nation's population, and stable income for its farmers.[61] However, as Turkey has embarked on a process of market liberalization, directed by the International Financial Institutions, the nature and extent of government involvement in the wheat sector has dramatically changed. I will analyze the impact of this change on the cultivation of traditional varieties.

As such, Turkey presents an excellent case to study the linkages between local, national and international levels in the conservation of crop genetic diversity. It is the center of diversity and/or origin of various crops, and farmers in different parts of Turkey have been conserving crop genetic resources for as many years via the practices of cultivating traditional varieties at the local level. Turkey has been the source of many traits that are used to breed improved agricultural crops in the world. As such, Turkey is a country gene-rich in domesticated species, a party to the environmental institution/regime represented by the CBD, and at the same time, in a process of accelerated agricultural liberalization, a perceived model by the IMF and the World Bank in terms of its reforms. Turkey represents a case at the intersection of two

---

Beniwal, and Alma McNab eds. (Dordrecht: Kluwer Academic Publishers, 1998) : 11-16.

[60] Hans-Joachim Braun et al., "Turkish Wheat Pool," in The World Wheat Book: A History of Wheat Breeding, Alain P. Bonjean and William J. Angus eds. (Paris: Lavoisier Publishing, 2001): 851-879.

[61] Nursen Albayrak, "Wheat Supply Response: Some Evidence on Aggregation Issues," Development Policy Review 16, (1998): 241-263. The World Bank estimation for total population of Turkey in 2003 is 70.7 million (World Development Indicators Database, August 2004).

competing institution/regimes, one environment, and the other economic, in an effort to balance them. While the CBD may provide opportunities for the conservation of crop genetic resources, these efforts overlap with the requirements of the agricultural restructuring dictated by the International Financial Institutions as reflected in national agricultural policies in Turkey. In this context, it is crucial to understand the factors that are at play at the local level that enable the farmers to continue the practices of cultivating traditional varieties. As I noted earlier, most centers of diversity are located within the borders of developing countries, and the analysis of the Turkish case will provide significant clues in understanding other cases of countries in the context of intersecting institutions/regimes and the relationship between the requirements of economic liberalization and the conservation of resources. The aim of the dissertation is to analyze the patterns of this multi-level governance in the conservation of crop genetic resources in Turkey. Based on this analysis, I hope to present concrete policy suggestions for the continuation of practices that conserve crop genetic diversity.

As part of crop genetic resources, landraces depend on human management to survive. Calvin O. Qualset, Ardeshir B. Damania, Ana Christina A. Zanatta, and Stephen B. Brush note that the primary distinction in methods for the conservation of crop plants from other biodiversity is that humans usually have a much stronger and essential role in conservation of crop plants.[62] For cultivated crop plants, the habitat is the farming unit itself, or in some cases, the local community, and humans are involved

[62] Calvin O. Qualset, Ardeshir B. Damania, Ana Christina A. Zanatta, and Stephen B. Brush, "Locally based Crop Plant Conservation," in Plant Genetic Conservation: The In Situ Approach, Nigel Maxted, Brian Ford-Lloyd, and John Gregory Hawkes, eds. (London; New York: Chapman & Hall, 1997): 160-175.

actively with the planting and harvest of each crop and have direct control of the fate of the crop and hence its biological diversity.[63] As such, policy suggestions will target these units for an effective conservation strategy.

1.5. Looking Ahead: A Brief Chapter Outline

This analysis of conservation of crop genetic diversity from the point of multi-level environmental governance comprehends various approaches. The analysis of the implementation process of the CBD in Turkey and its overlap with the IMF directed and WB assisted economic restructuring comprises the review of different approaches in International Relations literature, namely, realism, neoliberal institutionalism and constructivism in understanding the impact of international institutions/regimes at the national and local level. At the same time, the analysis of the factors that affect the conservation of crop genetic diversity at the local level has important implications for public policy considerations in the context of resource management. As the dissertation aims to show, with reference to farmers' practices of cultivation of landraces, the literature on social capital, with two different yet potentially complementary approaches (networks and synergy) can be significant in the design of these public policies. As the focus on social capital demonstrates, rather than mere provision of individual incentives, public intervention in the conservation of crop genetic resources need to take into account the social component of practices at the community level in the cultivation of landraces.

---

[63] Ibid.

An effort to understand the patterns of linkages across scales in the conservation of crop genetic resources also addresses the broader question of how to improve the provision of global public goods, when we consider the notion that the world's gene pool is an intergenerational global public good, maintained by activities at the local level.

The organization of the dissertation is as follows: In the second chapter, the theoretical approaches to the relationships between different levels of social organization, international, national and the local, with a focus on vertical and horizontal linkages in environmental protection are reviewed. Accordingly, the chapter provides the analytic framework within which multi-scale linkages are discussed.

The third chapter focuses at the local level conservation of crop genetic resources. It looks at the cultivation of traditional varieties by the wheat farmers in the Aegean Region and the Western Transitional Zone in Turkey. Based on the farmers' interviews that I conducted as part of my fieldwork, it provides an analysis of the factors that affect the farmers' capabilities of conserving genetic diversity. Building on this analysis, a brief discussion of the policy alternatives follows.

The fourth chapter of the dissertation shifts the focus to international and national levels. It provides a review of the international efforts at the conservation of plant genetic resources and biodiversity, discusses the history of biodiversity conservation in Turkey, and analyzes the linkages between international institutions/regimes and national level policy making with regard to genetic diversity conservation and agricultural policies. The chapter focuses on the politics of biodiversity conservation, the processes by which biodiversity conservation decisions

are taken at the national level in Turkey, and how these interact with the agricultural restructuring that is taking place. It also examines how the agricultural policies may affect the conservation of crop genetic diversity by the farmers, with particular attention to wheat producers.

The concluding chapter summarizes the overall findings of the dissertation, and discusses the implications of these findings for the conservation of crop genetic diversity, as the Turkish case shows. Accordingly, based on the analysis provided by the previous chapters, the chapter discusses the policy implications of the analysis of local, national and international levels for the conservation of crop genetic diversity.

CHAPTER 2

A THEORETICAL ANALYSIS OF THE LINKAGES BETWEEN INTERNATIONAL, NATIONAL AND LOCAL LEVELS IN ENVIRONMENTAL PROTECTION

2.1. Introduction

This dissertation analyzes the linkages between international, national and local level factors in the conservation of crop genetic diversity. The objective of the dissertation is to make the following theoretical contributions: Outlining and explaining the process through which international norms have an impact at the national level and the diffusion of policy innovations; and conceptualizing the process of vertical integration in environmental protection by looking at the relations between international, national and local levels. This is crucial in terms of environmental protection, and particularly in the case of conservation of genetic resources, since international and national frameworks will not go far if biodiversity conservation does not "make sense locally-in the context of local ecosystems and local people's lives."[1] The research question the dissertation addresses is: What are the factors that affect the conservation and evolution of crop genetic diversity by farmers at the local level? In terms of the linkages between factors at different levels, a related question is: How do international and national institutions/regimes affect the capabilities of farmers at the local level to conserve crop genetic diversity?

---

1 Charles Perrings and Madhav Gadgil, "Conserving Biodiversity: Reconciling Local and Global Public Benefits," in Providing Global Public Goods: Managing Globalization, Inge Kaul, Pedro Conceicao, Katell Le Goulven, Ronald U. Mendoza, eds. (New York: Published for the United Nations Development Programme [by] Oxford University Press, 2003), 542.

The literature review and the theoretical framework derived from this review presented in this chapter place these research questions in the broader context of how the international institutions/regimes affect national level variables, and integrates local factors. The first section of the chapter presents a brief review of approaches to analyzing cross-scale linkages. In the second section, the focus will be on theories of implementation and compliance of international obligations, with a review of different theoretical approaches in International Relations literature with regard to the influence of international institutions and issues concerning implementation and compliance, followed by an elaboration of social constructivism, which explains the processes through which norms and policy innovations diffuse to national frameworks, and a discussion on integrating local level factors. The chapter will incorporate a review of how this theoretical framework informs the analysis of the conservation of genetic diversity in Turkey.

2.2. Institutions and Cross-scale Linkages

Institutions can be both the 'causes of' as well 'prescriptions' to solve environmental problems.[2] Cases of resource management, as Fikret Berkes underlines, are neither small-scale, nor large-scale but *cross-scale* in both space and time.[3] Cross scale institutional linkages, such as the interplay between international, national and local levels have thus become a significant topic in the efforts to understand which

---

2 Oran B. Young, The Institutional Dimensions of Environmental Change (Cambridge, Mass. :The MIT Press, 2002).

[3] Fikret Berkes, "Cross-Scale Institutional Linkages: Perspectives from the Bottom Up," Paper prepared for NAS/NRC Panel on Institutions for Managing the Commons, 2000.

factors are relevant in environmental protection. The major reason for this interest is the transnational nature of most environmental problems, and the necessity for international cooperation in order to find a solution to stop further environmental degradation. In addition, the recognition that the policies adopted at the international and national levels needs to make sense locally as long as effective environmental protection is the ultimate goal. One of the approaches to understand the linkages between different levels looks at the implementation of deliberate policies designed to address the problem at hand; another approach focuses on the functional interdependencies of the scales in question, in contrast to "intentional links associated with the politics of design or management".[4]

Robert O. Keohane, Peter M. Haas and Marc A. Levy define institutions as "persistent and consistent sets of rules and practices that prescribe behavioral roles, constrain activity and shape expectations. They may take the form of bureaucratic organizations, regimes (rule structures that do not necessarily have organizations attached), or conventions (informal practices)."[5] A sub-group of institutions, international regimes, are defined as "implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given issue-area".[6] Young defines an institution as a recognized pattern of behavior, and an

---

[4] Oran R. Young, The Institutional Dimensions of Environmental Change (Cambridge, Mass. :The MIT Press, 2002), 85.

[5] Robert O. Keohane, Peter M. Haas and Marc A. Levy, "The Effectiveness of International Environmental Institutions" in Institutions for the Earth: Sources of Effective International Environmental Protection, Peter M. Haas, Robert O. Keohane and Marc A. Levy, eds. (Cambridge, Mass.: The MIT Press, 1993), 4-5.

[6] Stephen D. Krasner, "Structural causes and regime consequences: regimes as intervening variables," International Organization 36, 2, (1982): 185-204, 185.

organization as a material entity which possesses attributes such as an office, personnel, and so forth.[7] As such, regimes are issue-specific, and do not have the capacity to act, while an organization is equipped with staff capable of acting and does not have to be restricted to a single issue area.[8] Kristin Rosendal notes that a recognized institution will be more likely to be surrounded by a strong organizational set-up, or a strong organizational set-up may increase the impact of the institution.[9] As such, adding institutional elements to the international regime, the institution/regime captures not only the norms and rule structures but also the organizational features and patterns of behavior.[10]

Oran R. Young discusses two types of institutions: in the thin sense, institutions are systems of rules, decision making procedures, and programs as articulated in constitutive documents, such as treaties. Institutions in the thick sense, on the other hand, are social practices that are based on the rules of the game.[11] Haas underlines that

---

[7] Oran R. Young, Resource Regimes: Natural Resources and Social Institutions (Berkeley: University of California Press, 1982).

[8] See Andreas Hasenclever, Peter Mayer, and Volker Rittberger, "Interests, power, knowledge: The Study of International Regimes" Mershon International Studies Review 40, (1996): 177-228; Kristin Rosendal, The Convention on Biological Diversity and Developing Countries (Dordrecht: Kluwer Academic Publishers, 2000).

[9] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries.

[10] Similar to Kristin Rosendal The Convention on Biological Diversity and Developing Countries, I will follow the frequent practice of using institutions and regimes interchangeably.

[11] See Oran R. Young, The Institutional Dimensions of Environmental Change (Cambridge, Mass. :The MIT Press, 2002). According to Young, the thick definition of institutions include common discourses in terms of which to address the issues at stake, informal understandings regarding appropriate behavior on the part of participants, and routine activities that grow up in conjunction with efforts to implement the rules, 6.

governance consists of formal institutions designed to obtain collective goals generated from intersubjective beliefs and aspirations. In this context, international environmental governance is "a process, but one which is principally impelled by changes in formal and informal institutions."[12] In his discussion of a constructivist approach to international governance system, Haas notes that the system's structural form co-evolved with specific norms, rules and strategies for governments' environmental behavior. He argues that the institutionalization of a new ecological perspective, embodying norms, rules and strategies, was articulated by ecological epistemic communities and disseminated through formal governance institutions. "Once institutionalized within the formal structure of international environmental governance arrangements, new ecological beliefs have acquired a strong role in shaping the policies and practices of member units, and of actors' expectations about those policies and practices."[13]

Keohane, Haas and Levy note that it is convenient to use the word "institutions" to cover both organizations and rules, since clusters of rules are typically linked to organizations, and it is often difficult to disentangle their effects. In this context, this dissertation will focus on the international environmental institution/regime, the Convention on Biological Diversity, which comprises certain norms and rules with regard to conservation of biological diversity, as well as the CBD Secretariat, and

---

[12] Peter M. Haas, "Social Constructivism and the Evolution of Multilateral Environmental Governance," in Globalization and Governance, Aseem Prakash and Jeffrey A. Hart, eds. (London; New York: Routledge, 1999), 104.

[13] Ibid.

various subsidiary bodies, and its interaction with the neoliberal economic institution/regime, which is embodied by the international financial institutions, IMF and the World Bank, in their market-based policy prescriptions for expected state behavior through conditionality.

It is seldom, as Vinod Aggarwal emphasizes, that international institutions are created in a vacuum; rather, they need to be reconciled with existing ones.[14] In his study on how to reconcile multiple institutions, Aggarwal notes that in the process of creating or adapting new institutions, actors need to decide whether institutional reconciliation will occur through nesting or building parallel connections.[15] In the context of environmental protection, institutions created to deal with particular environmental problems or issues frequently become embedded in larger hierarchical structures.[16] When analyzing the institutional linkages, it is important to underline two distinct linkages: horizontal and vertical. At the international level, horizontal linkages refer to "connections between individual regimes and other institutional arrangements."[17] Vertical linkages, on the other hand, are the connections between international regimes and institutional arrangements that operate at lower levels of social organization, such as national, regional or local level arrangements.

---

[14] Vinod K. Aggarwal, "Reconciling Multiple Institutions: Bargaining, Linkages and Nesting," in Vinod Aggarwal ed. Institutional Designs for a Complex World: Bargaining, Linkages, and Nesting (Ithaca: Cornell University Press, 1998).

[15] Ibid.

[16] Oran R. Young, The Institutional Dimensions of Environmental Change (Cambridge, Mass.: The MIT Press, 2002), 9.

[17] Oran R. Young, Governance in World Affairs (Ithaca: Cornell University Press, 1999), 122.

As defined above, horizontal linkages can work in both ways. Interference by individual institution/regime's with one another's operations can have a negative impact on each other's operations, but more positive connections are also likely, such that nested institutions/regimes can cause mutual reinforcement of each other.[18] Haas underlines that state choices to comply may be affected by the issue related context within which such choices are taken.[19] In terms of the overlap of international institutions/regimes in the case of biodiversity, a considerable amount of research has been undertaken on the relationship between the CBD and the trade related aspects of intellectual property rights (TRIPs) under the World Trade Organization, analyzing the implications of this overlap for the operation of the CBD.[20] However, there is little work done looking at the interplay between the CBD and the restructuring of national agricultural policies dictated by the International Financial Institutions, such as the IMF and the World Bank.

The two international institutions/regimes that this dissertation is looking at, the CBD and the IMF/WB, are dealing with two separate yet linked activities. The former is focused on the conservation of biological diversity at three interrelated levels, the genes, species, and ecosystems levels, with a particular focus on *in situ* conservation, whereas

---

[18] Ibid.

[19] Peter M. Haas, "Choosing to Comply? Theorizing from International Relations and Comparative Politics," in Commitment and Compliance: The Role of Non-binding Norms in the International Legal System, Dinah Shelton ed. (Oxford; New York: Oxford University Press, 2000).

[20] For example, see Daniel Purdue, "Hegemonic Trips: World Trade, Intellectual Property and Biodiversity," Environmental Politics 4, 1 (1995): 88-107; Kristin Rosendal, "Impacts of Overlapping International Regimes: The case of Biodiversity," Global Governance 7 (2001): 95-117.

the latter aims at the provision of macroeconomic stability through arrangements in various sectors of national economies, including the agricultural sector.[21] Particularly with reference to agricultural biodiversity, the changes in agricultural policies can have an impact on the conservation of this diversity, as the farmers make land use decisions in the context of national agricultural policies and programs, which in turn are shaped and directed by international institutions/regimes.

Table 2.1. Focus, Aim and Preferred World Views of the CBD and the IMF/World Bank

International Institutions/regimes	The CBD	The IMF/World Bank
Focus	Environment	Economy
Aim	conservation of biological diversity at three interrelated levels, genes, species and ecosystems	*macroeconomic stability *increasing efficiency in various sectors, including the agricultural sector
Preferred world view	conservation of genetic resources, national sovereignty over resources, equity provision, distributional	Liberal economic order, incentives to induce market-oriented growth in developing countries

With regard to the conservation of crop genetic diversity in Turkey, which is the focus of this dissertation, I will look at whether and how these two institutions/regimes overlap in the context of implementation of the policies derived from these two at the national and local level. Both of them can have implications on the state capacity to

---

[21] Stefano Pagiola, John Kellenberg, Lard Vidaeus, and Jitendra Srivastava note that the World Bank's Country Assistance Strategies (CASs) have traditionally focused on macroeconomic performance, including questions of external debt management and domestic resource mobilization. Stefano Pagiola, John Kellenberg, Lard Vidaeus, and

conserve genetic resources, as well as agricultural practices of the farmers that maintain this diversity. When discussing conceptual nesting, Haas notes that if leaders hold a tightly coupled view of international politics, then such high level beliefs will exercise a strong influence over state choice in lower level conceptual areas.[22] He underlines that many less developed countries endorsed similar positions and presumably share similar compliance patterns in the issue areas that were addressed during debates over the new international economic order, including population, environment, and trade, because they shared a tightly coupled view of international political and economic relations, and they were nested below this broader conceptual organization of issues. For example, the ecological ideas embraced by the United Nations Environment Programme (UNEP), which was created in 1973, would be nested within the priorities of economic growth and development of the developing countries. In the Turkish context, the question is whether there is a hierarchy of policy priorities induced by the international institutions/regimes at the national level, namely, increasing the efficiency of the agricultural sector through liberalization, and the conservation of agricultural biological diversity.

While the objective of IMF/WB directed push for liberalization, (namely, market oriented production and less government intervention in the agricultural sectors with the aim to prevent inefficiency and huge public deficits caused by this intervention) per se does not provide a ground for incompatibility between the CBD

Jitendra Srivastava, "Mainstreaming Biodiversity in Agricultural Development: Toward Good Practice,", World Bank Environment Paper No.15, 1997.

[22] Peter M. Haas, "Choosing to Comply? Theorizing from International Relations and Comparative Politics," in Commitment and Compliance: The Role of Non-binding

aims, it is important to look at the possible impact of these regulations laid out by the IMF/WB in different contexts. For example, the implementation of these objectives may put pressure on the farmers for efficiency and market oriented production which could involve, in the case of crop genetic diversity, the abandonment of traditional varieties in favor of modern ones, or put pressure on the livelihoods of the farmers which may cause their abandonment of farming altogether. The dissertation aims to reveal the nature of this overlap at the national and local level in Turkey in the implementation of biodiversity policies as well as the practices of the farmers that conserve crop genetic diversity.

Some studies analyzing the linkages between micro and macro level orders have looked at the possibility of drawing lessons from research on small-scale settings for international cooperation on global commons. For example, Michael McGinnis and Elinor Ostrom make the case that the reasons for such an analysis are first, the substantive nature of many local and global problems is similar; second, although there are vast differences in the scale involved in local and global commons, the underlying logical configuration of the common-pool resources (CPRs) situation at these levels are fundamentally similar; and third, any global regime that undermines the requisites for successful cooperation at the local level will not be sustainable in the long run.[23] They

---

Norms in the International Legal System, Dinah Shelton ed. (Oxford; New York: Oxford University Press, 2000).

[23] Michael McGinnis, and Elinor Ostrom, "Design Principles for Local and Global Commons," in Robert O. Keohane, Michael McGinnis, and Elinor Ostrom, Proceedings of a Conference on Linking Local and Global Commons, held at Harvard University, April, 1992. They define common-pool resources as "natural or man-made resources in which (a) exclusion is nontrivial (but not necessarily impossible) and (b) yield is subtractable." 20.

highlight the importance of sustainable global regimes to make sense at all levels of aggregation -local, regional, national and global- underscoring that institutional arrangements at these multiple levels must be nested in such a way that "the institutions at each level are robust to the type of challenges that are likely to arise at that level".[24]

2.2.1. International and National Interactions: Implementation and Compliance of International Obligations

A crucial question with reference to the analysis of the linkages between international and national levels is how do international institutions/regimes operate to influence the behavior of actors, and in the process, solve environmental problems?[25] In particular, how do international environmental institutions/regimes influence the behavior of states and understanding the mechanisms through which this influence works has been an important research program. In line with the approach looking at the implementation of deliberate policies to solve an environmental problem, the literature on the effectiveness and implementation and compliance of international environmental obligations embodied by international accords and institutions aims to provide an answer to the above questions. Harold Jacobson and Edith Brown Weiss define implementation as the "measures that states take to make international accords effective

---

[24] Michael McGinnis, and Elinor Ostrom, "Design Principles for Local and Global Commons," in Robert O. Keohane, Michael McGinnis, and Elinor Ostrom, Proceedings of a Conference on Linking Local and Global Commons, held at Harvard University, April, 1992, 36-37.

[25] Oran R. Young, ed. Global Governance: Drawing Insights from the Environmental Experience (Cambridge, Mass.: The MIT Press, 1999).

in their domestic law."[26] In their conceptualization, compliance goes beyond implementation, referring to whether countries adhere to the provisions of the international accord and to the implementing measures that they have instituted, with an emphasis on the procedural as well as substantive obligations. An example of procedural obligations of a treaty is the requirement to report; substantive obligations refer to requirements to cease or control a particular activity. To this, Jacobson and Brown Weiss add compliance with the spirit of the treaty, namely, the broad normative framework that these specific obligations are placed within.[27]

On the other hand, Victor et al. offer a broader definition of implementation, such that it comprises the myriad acts of governments, such as promulgating regulations and new laws; activities of non-state actors, such as firms, scientists, environmental pressure groups whose activities are stimulated and redirected by an international agreement; and activities of international institutions such as monitoring and assisting national governments as they put international commitments into practice.[28] They note that putting international accords into practice requires a complex process of forming and adjusting domestic policy to conform with international standards, as well as coordinating activities of governments which are implementing different policies in

---

[26] Harold K. Jacobson and Edith Brown Weiss, "A Framework for Analysis' in Engaging Countries: Strengthening Compliance with International Environmental Accords, Harold K. Jacobson and Edith Brown Weiss eds. (Cambridge, Mass.: The MIT Press, 1998), 4.

[27] Ibid.

[28] David G. Victor, Kal Raustiala, and Eugene B. Skolnikoff, eds. The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice, (Laxenberg, Austria: International Institute for Applied Systems Analysis; Cambridge, Mass.: The MIT Press, 1998).

parallel.[29] According to this framework, implementation is the central process that turns commitments into action.

However, it is important to make the distinction between effectiveness of an international treaty or regime and compliance. While the countries can be in compliance with the obligations of a treaty, there still lies the possibility that the treaty may be ineffective in terms of achieving its objectives.[30] Or, as Haas underlines, if it is a small number of states which are the sources of the problem that the treaty was designed to confront, there is a possibility that universal compliance would not be required.[31]

In a review of compliance theory, Ronald Mitchell defines compliance as an actor's behavior that conforms to a treaty's explicit rules, and he distinguishes treaty-induced compliance as behavior that occurs because of the treaty's compliance system.[32] This is an important distinction. Haas emphasizes the distinction between deliberate compliance and serendipitous compliance, where in the case of the latter state

---

[29] Ibid.

[30] Harold K. Jacobson and Edith Brown Weiss, "A Framework for Analysis' in Engaging Countries: Strengthening Compliance with International Environmental Accords, Harold Jacobson and Edith Brown Weiss eds. (Cambridge, Mass.: The MIT Press, 1998).

[31] Peter M. Haas, "Why Comply, or some Hypotheses in Search of an Analyst," in International Compliance with Nonbinding Accords, Edith Brown Weiss, ed. (Studies in Transnational Legal Policy, No.29, The American Society of International Law, 1997), 21-48.

[32] Ronald B. Mitchell, "Compliance Theory: A Synthesis," Review of European Community and International Environmental Law 2, 4 (1993): 327-34; also in Environment in the New Global Economy: Volume II Applications, Peter M. Haas ed. (Cheltenham, UK; Northampton MA: Edward Elgar, 2003).

actions fit international obligations without deliberate choice.[33] Mitchell identifies three subsystems that compliance systems retain. The first is a primary rule system, which underscores that different solutions to the same problem will impose different costs on actors with different incentives to comply. Second is a compliance information system, consisting of the actors, rules, and processes that collect, analyze and disseminate information on violation and compliance; and finally, a noncompliance response system, which may facilitate compliance, sanction violation or prevent violation.

2.2.2. Realism, NeoLiberal Institutionalism and Social Constructivism

Different theoretical approaches in International Relations literature, such as realism, neo-liberal institutionalism, and social constructivism provide different explanations regarding the influence of international institutions/regimes at the national level. Realism, very briefly, asserts that the influence of international institutions/regimes is largely ephemeral. This is based on the idea that the rules embodied by international institutions/regimes mainly reflect state calculations of self interest based primarily on the international distribution of power.[34] In this approach, it is the most powerful states that create and shape institutions/regimes in such a way that they can maintain their share of world power. In this context, they have no independent effect on state behavior. States are the dominant actors in world politics, and they have

---

[33] Peter M. Haas, "Why Comply, or some Hypotheses in Search of an Analyst," in International Compliance with Nonbinding Accords, Edith Brown Weiss, ed. (Studies in Transnational Legal Policy, No.29, The American Society of International Law, 1997), 22.

[34] John J. Mearsheimer,"The False Promise of International Institutions," International Security 19, 3 (Winter 1994/95): 5-49.

a priori defined interests. As such, Keohane notes that, 'given state interests', whose origins are not predicted by realist theory, the pattern of outcomes in world politics are determined by the overall distribution of power among the states.[35] Norms do not have an explanatory role according to realism, as the norms simply reflect the interests of the dominant actors.[36] In this framework, if and when state compliance with reference to an international agreement does occur, it will be because of the existence of a dominant state which will compel the other states to comply.

Neoliberal institutionalism argues that the influence of international institutions/regimes will be to the extent that they enable the actors to maximize their interests. Robert O. Keohane and Lisa Martin underline how institutions can provide information, reduce transaction costs, make commitments more credible, establish focal points for coordination and in general, facilitate the operation of reciprocity.[37] They suggest that institutions can alleviate fears of unequal gains from cooperation, through provision of information about the distribution of gains. Lisa Martin and Beth Simmons discuss two models with reference to understanding the role of institutions.[38] The informational model looks at the role of institutions in the provision of information, and

---

[35] Robert O. Keohane, "Structural Realism and Beyond," in Neorealism and its Critics, Robert O. Keohane ed. (New York: Columbia University Press, 1986).

[36] Loren Cass, "Rhetoric Versus Reality: Ideas and Material Interests in the Development of German, British, and American Climate Policy 1987-1991," Paper presented at the Northeastern Political Science Association Meeting, Philadelphia 2001.

[37] Robert O. Keohane, and Lisa L. Martin, "The Promise of Institutionalist Theory," International Security 20,1 (Summer 1995): 39-51.

[38] Lisa L. Martin, and Beth A. Simmons, "Theories and Empirical Studies of International Institutions," International Organization 52, 4 (1998): 729-757.

in the learning process. This can lead to predictions about the conditions under which international institutions can provide policy relevant information and about the effects of such information on patterns of state behavior. The distributional model explores the role of international institutions in facilitating or hampering mutually beneficial issue linkages. In this context, institutions will be most successful in allowing for credible cross-issue deals between states, when the state(s) with the most intense interest in an issue dominate policy making, and when institutional mechanisms established prevent states from reneging cross issue deals.[39] What is most important to underline in the institutionalist approach is the idea that institutions change the incentive structure of states, which is the mechanism through which they have an impact on state behavior.

Both the realist and neoliberal institutionalist approaches take the states as unitary, rational actors whose interests are given, without paying attention to the processes by which the actors' interests and identities are formed and reshaped. Mitchell notes that the rationalist mechanism, as one of the mechanisms by which international institutions influence state behavior, is based on the idea of "logic of consequences", in which states alter their behavior as a response to calculations about what is in their best interest.[40] According to this model, international environmental

---

[39] Ibid.

[40] Ronald B. Mitchell, "Of course International Institutions Matter: But When and How?" in Proceedings of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change and the Nation State, Frank Biermann, Rainer Brohm and Klaus Dingwerth eds. (Potsdam, Potsdam Institute for Climate Impact Research, 2002), 16-25.

institutions alter behavior by providing mainly instrumental changes to the world in which states make decisions.

In this context, at the stage of regime formation at the international level in biodiversity conservation, the realist view would argue that for international cooperation to occur, the existence of a hegemon or dominant actors is important, and in terms of issue framing, the international agreement will reflect the interests of the dominant or powerful actors. As such, realists would expect that the North will have access free of charge to the biological resources of the South, while the South will be pressured into putting restrictions on the exploitation of their own natural resources, and it is highly unlikely for developing country interests to dominate the agreement, unless they coincide with the interests of the dominant actors.[41] With reference to the implementation stage of the CBD, according to realism, the existence of a hegemon, which will provide rewards or sanctions, will influence whether or not a state (i.e. Turkey) will implement the CBD obligations at the national level. As noted above, one would expect that the norms of the CBD should reflect the interests of the hegemon or powerful states who negotiated the convention. If this is not the case, then the norms, principles and rules of the CBD will hardly be reflected in practical political action.[42] Thus, according to realism, all stages of policy formation are the same, namely, based on the existence of a hegemon or a dominant actor. Realism does not offer any insights about what the implications would be at the local level.

---

[41] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries (Dordrecht: Kluwer Academic Publishers, 2000).

[42] Ibid.

Neoliberal institutionalism, on the other hand, would argue that at the regime formation stage, cooperation is possible if the CBD, as an international agreement, is able to provide institutional mechanisms that will reduce uncertainty, such as providing information, and monitoring and align different actors' interests. In terms of issue framing, institutional factors may facilitate the development of agreement between different parties. At the implementation stage, according to neoliberal institutionalism, a state will implement the CBD in accordance with its cost-benefit calculations based on the incentives provided by the CBD, focusing largely in material incentives, for example, through financial transfers and technical capacity building activities at the national level. For example, the financial transfers from the Global Environmental Facility (GEF-the financial mechanism of the CBD) would provide incentives for Turkey to implement the CBD if Turkey decided that the benefits that accrue from these implementation activities will be more than the costs they will entail. This capacity building at the national level may induce conservation of genetic resources at the local level. At the same time, at the policy enforcement stage, neoliberals would predict that provision of information about other states' activities on biodiversity conservation can induce compliance, as this would reduce fears of free riding, and help to build reputation, which can be particularly important as states would like to pursue their interests in other areas.

However, as noted above, both of these approaches take the state interests as exogenous, and fail to explain the process by which state interests are defined and shaped. Realists reject an explanatory role for norms in the definition and pursuit of national interests, arguing that norms merely reflect the already defined interests of the

dominant actors in the international realm. Neoliberals also argue that the dominant actors play a significant role in the formation of norms.

Constructivism, on the other hand, analyzes the process by which collective representations of the world are constructed and diffused.[43] Constructivists reject that the stages of norm formation, policy enforcement and compliance simply reflect the a priori defined interests and the power positions of the dominant actors. Social learning focuses on the diffusion process of the norms that the international institutions embody, and the processes through which these norms are translated into policy practices at the national level. Mitchell argues that the constructivist mechanisms of influence are based on the idea of "logic of appropriateness", where state behavior is explained as a function of the identities states adopt and behaviors considered appropriate to those identities.[44] Norms, in this framework, can be "constitutive" in instances when they specify the actions that will cause other actors to recognize and validate a particular identity and to respond to it appropriately.[45] Or, norms can be "regulative" when they

---

[43] Peter M. Haas, "Choosing to Comply? Theorizing from International Relations and Comparative Politics," in Commitment and Compliance: The Role of Non-binding Norms in the International Legal System, Dinah Shelton ed. (Oxford; New York: Oxford University Press, 2000).

[44] Ronald B. Mitchell, "Of course International Institutions Matter: But When and How?" in Proceedings of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change and the Nation State, Frank Biermann, Rainer Brohm and Klaus Dingwerth eds. (Potsdam, Potsdam Institute for Climate Impact Research, 2002), 16-25. The "logic of appropriateness" and "logic of consequences" is based on James G. March and Johan P. Olsen, "The Institutional Dynamics of International Political Orders," International Organization 52, 4 (1998): 943-970.

[45] Ronald L. Jepperson, Alexander Wendt and Peter J. Katzenstein define norms as collective expectations about proper behavior for a given identity. Ronald L. Jepperson, Alexander Wendt and Peter J. Katzenstein, "Norms, Identity and Culture in National

operate as standards for the proper enactment of a defined identity, as they prescribe or proscribe behaviors.[46] In relation to compliance with international obligations, Abram Chayes, Antonia Handler Chayes and Ronald B. Mitchell argue that norms provide the foundation for the compliance process.[47] They note that actors regularly appeal to legal norms in their justification of behavior, and they legitimize those norms and reinforce the expectations that will constrain their own behavior in the future.

As opposed to the view by realists and institutionalists of states as unitary rational actors, constructivists do not assume that states are monolithic.[48] The characteristics of states "vary in terms of the extent to which the state is accountable to domestic society...Moreover, states are functionally differentiated, made up of multiple competing bureaucratic elements each with its own functional jurisdiction or domain".[49]

In terms of biodiversity conservation, a core norm that the CBD embraces is the recognition of the sovereign rights of states over the genetic resources that are within

---

Security," in The Culture of National Security: Norms and Identity in World Politics, Peter J. Katzenstein ed. (New York: Columbia University Press, 1996), 54.

[46] Ibid.

[47] Abram Chayes, Antonia Handler Chayes and Ronald B. Mitchell "Managing Compliance: A Comparative Perspective" in Engaging Countries: Strengthening Compliance with International Environmental Accords, Harold K. Jacobson and Edith Brown Weiss, eds. (Cambridge, Mass.: The MIT Press). Their definition of norms are as "prescriptions for action in situations of choice, carrying a sense of obligation, a sense that they ought to be followed", 42.

[48] Peter M. Haas, "Compliance with EU Directives: Insights from International Relations and Comparative Politics," Journal of European Public Policy 5, 1 (1998): 17-37. Also in Environment in the New Global Economy, Peter M. Haas ed. (Cheltenham, UK; Northampton MA: Edward Elgar, 2003).

[49] Ibid, 21.

their territory. The conservation of biological diversity, their sustainable use, and the equitable sharing of the benefits that arise from the utilization of these resources are the main objectives that the Convention lays out. The normative orientation toward equitable sharing, Rosendal argues, builds on the understanding that costs and benefits of biodiversity have long been asymmetrically distributed, and that this situation needs to be remedied to prevent biodiversity loss.[50] Rosendal notes that this was developing countries' breakthrough, as the equity provisions in the CBD text reflect the position of gene-rich developing countries in the South.[51] Some institutions/regimes, she underlines, may have strong normative influence –a high degree of legitimacy—even in the absence of powerful states pushing for the implementation of stronger compliance mechanisms.

The constructivist literature on epistemic communities analyzes the nature of the diffusion process of the norms that the international agreements have adopted to national policy frameworks. Haas defines epistemic communities as "networks of knowledge-based communities with an authoritative claim to policy relevant knowledge

---

[50] Kristin Rosendal, "Impacts of Overlapping International Regimes: The case of Biodiversity," Global Governance 7 (2001): 95-117.

[51] Rosendal adds that one interpretation of the developing countries' breakthrough in the CBD could be that the United States had stopped worrying about the results of the biodiversity negotiations because it was confident that its interests would be secured by the TRIPs regulations in the WTO. This interpretation, she notes, disregards the fact that it was the Northern countries, and most prominently the United States, that were at the lead in efforts to establish a convention on biodiversity. See Kristin Rosendal, "Impacts of Overlapping International Regimes: The case of Biodiversity", 108.

within their domain of expertise".[52] A causal pathway by which the epistemic communities can have an impact on policy is they can insinuate their views and influence national governments and international organizations by occupying niches in advisory and regulatory bodies.[53]

Emmanuel Adler and Peter M. Haas propose that members of an epistemic community can play both direct and indirect roles in policy coordination by "diffusing ideas and influencing the positions adopted by a wide range of actors, including domestic and international agencies, government bureaucrats and decision makers, legislative and corporate bodies, and the public."[54] Haas notes that the application of consensual knowledge to policy making depends on the ability of the groups transmitting this knowledge to gain and exercise bureaucratic power.[55] "If an epistemic communities' ideas become strongly embedded in the regulatory agencies of an individual country, they can directly influence the setting of standards and development of policies in that country." [56] Thus, based on Haas's conception, Rosendal underscores

---

[52] Peter M. Haas, "Epistemic Communities and the Dynamics of International Environmental Cooperation," in Volker Rittberger ed. Regime Theory and International Relations (Oxford: Clarendon Press, 1993).

[53] Peter M. Haas, ed. "Knowledge, Power, and International Policy Coordination" Special Issue of International Organization 46, 1 (1992).

[54] Emmanual Adler and Peter M. Haas, "Conclusion: epistemic communities, world order, and the creation of a reflective research program," Peter M. Haas, ed. "Knowledge, Power, and International Policy Coordination" Special Issue of International Organization 46, 1 (1992), 379.

[55] Peter M. Haas, ed. "Knowledge, Power, and International Policy Coordination" Special Issue of International Organization 46, 1 (1992).

[56] Emmanual Adler and Peter M. Haas, "Conclusion: epistemic communities, world order, and the creation of a reflective research program," 379.

that at the stage of implementation, the group's members may hold administrative positions in governments, encourage common policies to their respective governments, and push for their enforcement.[57] However, it is also crucial to distinguish epistemic communities from bureaucratic bodies, as Haas underlines, while the members of epistemic communities may use the bureaucratic leverage they are able to acquire, because of their normative objectives and causal beliefs, their behavior will not be limited by bureaucratic constraints.[58]

As such, according to the constructivist approach, at the regime formation stage, consensual knowledge and social learning will give rise to commonly accepted international norms and ideas, which will then become formalized, and in terms of issue framing, the direction of this learning process will be dependent on who constitutes the epistemic communities.[59] At the implementation stage, in a path-dependent way in line with framing decisions, the role of epistemic communities in the process of diffusing CBD norms and policy innovations with regard to conservation of biological diversity in general and genetic diversity in particular can be very important. The CBD may provide the space for these actors to incorporate their input into the domestic policy making process for conservation activities. Thus, constructivist approach would predict

---

[57] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries (Dordrecht: Kluwer Academic Publishers, 2000).

[58] Peter M. Haas, ed. "Knowledge, Power, and International Policy Coordination" Special Issue of International Organization 46, 1 (1992).

[59] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries.

that the CBD in the Turkish context will provide the space and channels for scientific input to be integrated to the policy making process.

In this context, the role of ideas embedded in institutions, shaping perceptions and decisions taken under their auspices, and conditioning practical policy choices by actors influenced by the institution is crucial.[60] International institutions can be significant to help build the state will to enforce commitments.[61] International environmental institutions are also vehicles for transferring skills and expertise and for empowering domestic actors who are motivated to solve domestic problems of international significance.[62] Institutions can foster capacity building at the national level by providing policy relevant knowledge in a form that is readily usable.[63] This is particularly significant in the context of developing countries, as these countries may be willing to comply with international norms and rules, but not have the capability to do so.[64] Brown Weiss and Jacobson propose two dimensions when discussing the dynamics of compliance behavior of states as they join international agreements, the

---

[60] Peter M. Haas, "The Future of International Environmental Governance," Global Peace and Conflict Studies at UC Irvine (Working Paper 96-1, 1996).

[61] Ibid.

[62] Peter M. Haas, Robert O. Keohane and Marc A. Levy, eds. Institutions for the Earth: Sources of Effective International Environmental Protection, (Cambridge, Mass.: The MIT Press, 1993).

[63] Ibid.

[64] Peter M. Haas, "The Future of International Environmental Governance,"

intention to comply and the capacity to comply.[65] Intention to comply is the foundation for compliance, yet countries also need the capacity to comply, for which assets such as an effective and honest bureaucracy, economic resources, technical expertise and know-how, and public support are crucial.[66] Brown Weiss and Jacobson emphasize the importance of the issue of prioritization in some cases, that is, how much to devote to compliance with certain obligations in the agreement, which is particularly difficult when compliance requires coordination among several ministries, or with provincial and local governments.[67]

Keohane, Haas and Levy stress the importance of political and administrative capacity of states to undertake the domestic adjustments that are necessary for the implementation of international norms, principles, or rules.[68] They define political and administrative capacity as "not only the ability of governments to make and enforce laws and regulations, but also the broader ability of actors in civil society to play an effective role in policy making and implementation".[69] As such, capacity building go well beyond the technical dimension, but also include providing a public commitment to a set of norms and principles, which can be used by domestic proponents of

---

[65] Edith Brown Weiss and Harold K. Jacobson, "Getting Countries to Comply with International Agreements" *Environment* 41, 6 (1999): 16-45.

[66] Ibid.

[67] Ibid.

[68] Peter M. Haas, Robert O. Keohane and Marc A. Levy, eds. Institutions for the Earth: Sources of Effective International Environmental Protection, (Cambridge, Mass.: The MIT Press, 1993), 20.

[69] Ibid.

adjustment measures in their attempts to overcome their opponents in funding and turf battles.[70]

Kenneth Hanf and Arild Underdal argue that the formulation as well as the implementation of international agreements do not occur in a vacuum.[71] A regulatory space, already occupied by a set of problem definitions and constellations of supporting and opposing societal and bureaucratic forces provide the context into which these agreements enter.[72] Similarly, Victor et. al. underline that implementation experiences vary by nation and locality since international commitments overlap with other goals of domestic policy.[73] They note that in instances where national implementation is complex, more political and economic interests are likely to be affected, leading to political mobilization and shifting coalitions, which produce less predictable outcomes.[74] Thus, they view it crucial to analyze the context within which the implementation of an international agreement is embedded.

---

[70] Ibid, 23.

[71] Kenneth Hanf and Arild Underdal, International Environmental Agreements and Domestic Politics: The Case of Acid Rain (London: Ashgate Studies in Environmental Policy and Practice, 2000).

[72] Kenneth Hanf, "The Domestic Basis of International Environmental Agreements," in International Environmental Agreements and Domestic Politics: The Case of Acid Rain, Kenneth Hanf and Arild Underdal, 8.

[73] David G. Victor, Kal Raustiala, and Eugene B. Skolnikoff, eds. The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice, (Laxenberg, Austria: International Institute for Applied Systems Analysis; Cambridge, Mass.: The MIT Press, 1998).

[74] Ibid, 660.

In an effort to answer the question of how causal pathways link factors at the international and national level in the process of implementing international environmental agreements, Rosendal identifies four institutional mechanisms: moral, material, mutual reinforcement, and empowerment.[75] Moral mechanism refers to the scope for willingness to implement, that is, the content of the agreement may be perceived as legitimate in itself, or an agreed international norm may be perceived as an obligation. As such, at the national level, the assumption is that this mechanism will affect commitment, as well as state capacity (indirectly) to formulate and enforce environmental policies. The material mechanism on the other hand focuses on how the agreement may affect domestic cost and benefit calculations relating to implementation. Mutual reassurance focuses on the role of information, monitoring and sanctions in reducing uncertainties about free riders among the participants in the agreement in the implementation process. Lastly, the empowerment mechanism Rosendal proposes refers to how an international regime may encourage alliances between international and nongovernmental domestic actors, inducing far reaching domestic implementation of regime objectives at the national level, the most important actors in this mechanism are epistemic communities.

With reference to compliance, Haas notes that states may engage in three related types of learning.[76] In the first type of learning, the adoption of new consensual

---

[75] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries, 269.

[76] Peter M. Haas, "Choosing to Comply? Theorizing from International Relations and Comparative Politics," in Commitment and Compliance: The Role of Non-binding Norms in the International Legal System, Dinah Shelton ed. (Oxford; New York: Oxford University Press, 2000), 63.

knowledge about how state interests are to be achieved is crucial. States also can learn to comply with related instruments in the same area of activity, for example, they may recognize that national interests are protected by environmental protection, and as such, may be willing to comply with other environmental commitments. Lastly, states can learn about "the connection between issues and thus change compliance patterns over time due to the acceptance of new 'policy maps' which identify goals that must be achieved in order to promote national goals".[77]

2.3. Hypotheses about the Conservation of Genetic Diversity in Turkey

As noted in the beginning of the chapter, the dissertation analyzes the linkages between different levels in the conservation of genetic resources and diversity in the case of Turkey, with a focus on the biodiversity institution/regime embodied by the Convention on Biological Diversity, and the neoliberal economic institution/regime fostered by the IMF and the World Bank, directing national agricultural policies towards liberalization.

In the context of the different theoretical approaches in International Relations, the dissertation will analyze the following propositions: According to the realist approach, Turkey would implement the obligations stemming from the CBD if and when a powerful state or states compelled it to do so. According to this approach, the CBD would reflect the interests of the dominant states who negotiated the Convention. The mechanism by which implementation would occur is rewards and sanctions

---

[77] Ibid.

provided by the dominant actors. The neoliberal institutionalist approach would propose that a party to the CBD would implement the activities outlined by the CBD to the extent that these implementation activities serve (*a priori* defined) interests of the party in consideration. As such, Turkey would implement the CBD as long as the costs of implementation will not exceed the benefits derived from it. This approach embraces the importance of material and mutual reassurance mechanisms as identified by Rosendal in terms of the calculations of costs and benefits of implementation activities. As such, financial transfers, and information about other countries' activities regarding the biodiversity regime would be crucial in determining implementation activities in Turkey. On the other hand, the constructivist approach would predict that Turkey would engage in implementation activities as a consequence of the process of learning through the diffusion of the norms and policy innovations adopted by the CBD, even in the absence of sanctions. This approach underlines the importance of both moral and empowerment mechanisms that Rosendal proposes. That is, the importance of normative persuasion, as well as strengthening of domestic actors who advocate conservation activities. Levy et al. emphasize the various mechanisms through which governmental concern can boost: "When international principles and norms have been agreed upon, they may acquire a certain legitimacy and come to be regarded as premises, or as intrinsically valuable, rather than as contestable reflections of interest-based compromises."[78]

---

[78] Marc A. Levy, Robert O. Keohane, and Peter M. Haas, "Improving the Effectiveness of International Environmental Institutions," in Peter M. Haas, Robert O. Keohane and Marc A. Levy eds. Institutions for the Earth: Sources of Effective International Environmental Protection (Cambridge, Mass.: The MIT Press, 1993), 400.

The main hypothesis of the dissertation is that the international level factors (the CBD and the IMF/WB), through the mediation of national level variables (state capacities), will have an impact on the capabilities of farmers to continue practices that will conserve crop genetic diversity at the local level. This dissertation aims to contribute to an understanding of the interplay between CBD and the IMF/WB by looking at the case of Turkey. For the purposes of the dissertation, what is important is the extent to which this overlap is reflected in the domestic capacity of Turkey to undertake biodiversity (in particular, genetic diversity) conservation measures.

In terms of this overlap, first, I will argue that the CBD will have a positive impact on the national capacity of Turkey to conserve genetic diversity at the domestic level. The definition of state capacity is based on the definition offered by Haas et. al. above. As they underline, the activities of institutions in the context of their role in building national capacity include creation of interorganizational networks with operational organizations to transfer technical and management expertise, transfer of financial assistance, transfer of policy-relevant information and expertise, and boost of bureaucratic power of domestic allies.[79] For example, the Global Environmental Facility (GEF), the designated financial mechanism of the CBD, can be instrumental in fostering capacity building through the biodiversity conservation projects that it finances.

I noted above that neoliberal institutionalism, focusing on material incentives, would propose that financial transfers would be important in bringing about implementation measures, if the perceived benefits from these transfers are more than the costs of implementation. However, the CBD not only can provide financial

resources and technical infrastructure for the conservation of genetic resources. The signing of the CBD can be crucial in terms of offering channels for the scientists who had been working on biodiversity conservation, as well as NGOs to participate in the formulation and implementation of conservation activities, particularly *in situ*. In line with the constructivist approach, the moral and empowerment mechanisms that Rosendal identifies can be extremely significant in legitimizing the norms and policy innovations in relation to the CBD and strengthening the position of the scientists and NGOs in Turkey.

Secondly, I will argue that the IMF/WB, through the push for agricultural liberalization, will have a negative impact on the national capacity of Turkey to implement policies regarding conservation of genetic diversity. For example, the policy priority of increasing productivity and efficiency through substantial changes in the nature of government involvement in the agricultural sector, which is *the* crucial component of IMF/WB assisted policies, can reduce the national capacity of Turkey to support crop genetic diversity. One crucial question that remains is how to reconcile this paradox, that is, whether it is possible to link economic efficiency concerns with the conservation of genetic resources.

In the next section, I will address the question of how we can identify the mechanisms through which national and international level variables link to local level factors with regard to environmental issues in general, and resource conservation in particular. I will review the literature on social capital, with the networks and the synergy approach with reference to the cultivation of landraces at the local level in

---

[79] Marc A. Levy, Robert O. Keohane, and Peter M. Haas, "Improving the Effectiveness

Turkey. The constructivist approach, with the moral and empowerment mechanisms, explains how norms and policy innovations at the international level diffuse at the national level. The empowerment mechanism can be extremely important in the local participation for the conservation of crop genetic resources, for example, the recognition of the importance of the NGOs in local conservation efforts. This process of local participation is inextricably linked to the social capital, both efforts particularly to build social capital from "outside in" (or, the synergy approach), as well as the networks view which emphasizes the sources of social capital (i.e. practices of reciprocity) within the farmers communities at the local level in Turkey for the conservation of landraces. In capacity building measures, the literature on social capital point to the need to take into account those components of social capital that sustains practices of conservation of crop genetic diversity, rather than merely providing individual incentives to farmers. One point that should be underlined is that the cultivation of landraces by the farmers at the local level in turn provides crop genetic diversity which is a global public good as it provides the world's food security. As such, the local level conservation of crop genetic diversity has significant global implications.

---

of International Environmental Institutions,"

Table 2.2. Level of Analysis, Outputs and Causal Variables

Levels of Analysis		Outputs	Causal variables			
			Realism	Neoliberal Inst.	Constructivism	Social Capital
International	International Environmental Institution/ Regime (CBD) International Economic Institution/ Regime (IMF/WB)	Conservation of genetic resources (*in situ*) policies aimed at liberalizationof the agricultural sector to increase efficiency	Hegemon Rewards and sanctions	Incentives that will affect cost-benefit calculations financial transfers information	Norms and policy innovations Persuasion learning	
National	State (Turkey)	**In situ* conservation of wild genetic resources *Elimination of state role in agriculture *Markets for efficiency *Direct Income System for farmers		Technical capacity building	Legitimacy of norms Empowerment of domestic actors for biodiversity protection scientists NGOs	Social Capital (synergy) Embeddedness
Local	Stakeholders (farmers)	Landrace cultivation				Social capital (networks) Reciprocity

Continued, next page.

Table 2.2, cont'd.:

Levels of Analysis		Outputs	Causal variables			
			Realism	Neoliberal Inst.	Constructivism	Social Capital
Effectiveness on biodiversity protection			CBD will have an impact if backed by a hegemon or dominant states	CBD will have a positive impact on state capacity to conserve biodiversity IMF/WB will have a negative impact on state capacity	CBD will have a positive impact through the diffusion of norms and policy innovations to conserve biodiversity	
Influence on landrace practices		CBD will have a positive impact IMF/WB directed agricultural policies will have a negative impact if: -farmers decide to cultivate modern varieties rather than landraces -farmers convert to other crops (than wheat) -farmers abandon agriculture altogether		CBD may have a positive impact through capacity building at the local level.	CBD may have a positive impact if policy innovations extend to the cultivation of landraces	Positive impact Social capital (networks) Local knowledge, reciprocity (seed exchange, taste and preferences Positive impact Social capital (synergy) Embeddedness-if the CBD norms and policy innovations are embraced by public officials in their relations with the farmers.

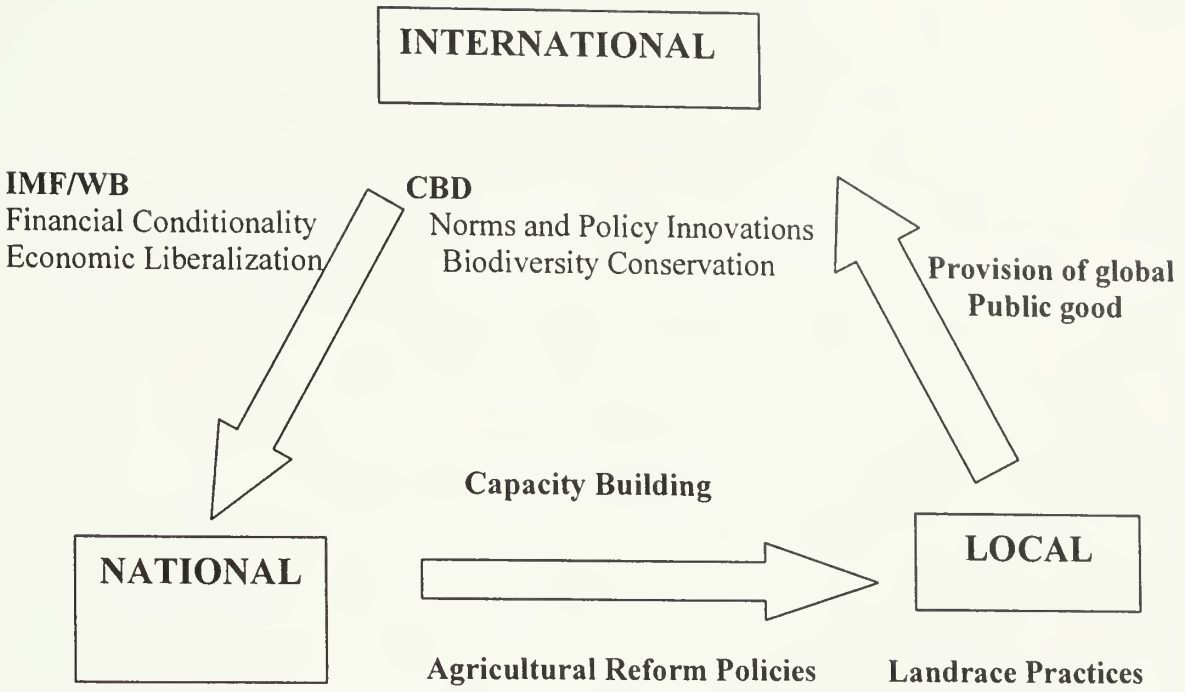


Figure 2.1. Linkages

2.4. Integrating the Local Level in the Analysis of Conservation of Crop Genetic Diversity

In his study on cross-scale linkages, Fikret Berkes focuses on the ways in which higher level institutions have (positive and negative) effects on local institutions, and identifies promising institutional forms for linking across levels of institutions.[80] Included in the mechanisms through which higher level institutions have negative impacts on local institutions Berkes identifies are centralization of decision making,

[80] Fikret Berkes, "Cross-Scale Institutional Linkages: Perspectives from the Bottom Up," Paper prepared for NAS/NRC Panel on Institutions for Managing the Commons, 2000.

increased participation in national and international markets, and national-level development projects.[81] Centralization of decision making involves a managerial elite's taking over of resource management functions, which may lead to change in the way knowledge is used for management, as well as a change in control over a resource. A form of market impact can be the commercialization of a subsistence resource, which may lead to the demise of the local institutions as well as the resource itself. As for the impact of national-level development policies on local level, Berkes underlines that development policies are often carried out through the centralization of decisions and increased participation in market economies, as well as the application of inappropriate pricing, subsidies, legislation, and governmental incentives.[82] Yet, Berkes also highlights the positive effects higher level institutions can have at the local level, including state recognition of local institutions, development of enabling legislation, capacity building and local institution building.[83]

Similarly, with reference to biodiversity conservation, Elinor Ostrom underlines the importance of processes by which national and regional governments can enhance or detract from the capabilities of local entities by the kind of information they provide, by provision of low cost conflict resolution mechanisms, and by policies that allow localities to develop and keep financial resources that can be used to make local

---

[81] Ibid.

[82] Ibid.

[83] Ibid.

improvements.[84] Oran R. Young also notes how national arrangements can afford greater opportunities to take into account the dynamics of large marine and terrestrial ecosystems, yet at the same time, national regimes can facilitate and sometimes indeed promote commodification, that is "large scale, consumptive, market driven and often unsustainable uses of targeted resources."[85] He notes that these regimes can provide a context where the interests of powerful yet nonresident players dominate the interests of small scale, local residents.

Ostrom argues that if the nature of systems that are to be governed or regulated are complex, without creating complex, nested systems of governance, the "very processes of trying to regulate behavior so as to preserve biodiversity will produce the tragic and unintended consequence of destroying the complexity we are trying to enhance."[86] A complex system is one in which many subsystems can be discerned.[87] For example, a small watershed may be considered an ecosystem, but it is part of a larger watershed that is also an ecosystem, as such, each subsystem is nested in a larger

---

[84] Elinor Ostrom,"Scales, Polycentricity, and Incentives: Designing Complexity to Govern Complexity," in Protection of Global Biodiversity: Converging Strategies, Lakshman Guruswamy and Jeffrey A. McNeely eds. (Durham, N.C.: Duke University Press,.1998).

[85] Oran B. Young, The Institutional Dimensions of Environmental Change (Cambridge, Mass.: The MIT Press, 2002), 86.

[86] Elinor Ostrom,"Scales, Polycentricity, and Incentives: Designing Complexity to Govern Complexity," 149.

[87] Fikret Berkes, Johan Colding, and Carl Folke eds. Navigating Social-Ecological Systems: Building Resilience for Complexity and Change (Cambridge, U.K.; New York: Cambridge University Press, 2003).

subsystem.[88] Fikret Berkes, Johan Colding, and Carl Folke similarly that institutions can be considered as a nested set of systems from the local level, through regional and national to the international.

When referring to resource management by local communities, the traditional knowledge that these communities possess provides an important link in terms of how to integrate local level factors into policy practices. Berkes et al. define traditional ecological knowledge as a "cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with another and with their environment".[89] They note that while traditional signifies historical and cultural continuity, societies are in a dynamic process of change, constantly redefining what is considered as traditional.

In his discussion of the role that small farmers can have in providing a crucial public good, the conservation of agricultural biodiversity, James K. Boyce emphasizes that the hallmark of 'traditional' agriculture is its dynamism, "in the farmer's fields, the process that Charles Darwin termed 'artificial selection'(natural selection guided by human hands) yields a constant stream of new varieties, adapted to changing needs and changing environmental circumstances".[90] In this context, high diversity agriculture depends on the farmers' knowledge of different crop varieties and their relationships to

---

[88] Ibid, 6.

[89] Ibid, 12.

[90] James K. Boyce, "A Future for Small Farms? Biodiversity and Sustainable Agriculture," Amherst, MA: Political Economy Research Institute, Working Paper No.86, 2004 (http://www.umass.edu/peri/pdfs/WP86.pdf), 2-3.

microhabitat variations, and small farmers are the repositories of this knowledge.[91] This diversity, as Brush also underlines, embodies the collected wisdom and experience of the hundreds of generations of farmers who have selected and managed crop populations since the Neolithic Revolution, some 5,000 to 8,000 years ago.[92] It is also important to note that this cultivated biodiversity is different from wild biodiversity, in that any effort *in situ* conservation of cultivated diversity recognizes the contribution of the agricultural activities of the farmers, and requires the affirmation of these activities. On the other hand, the exclusive focus on wild biodiversity often views the agricultural practices of the farmers as potentially destructive.

As noted above, capacity building at the local level has been suggested as one of the mechanisms through which national and local level factors can be linked in a positive manner for resource conservation. Berkes proposes an understanding of capacity building based on a comprehensive view that emphasizes the importance of institutional arrangements, appropriate government policies and legal frameworks, and stakeholder participation. In this context, contributing to the capabilities of local communities to conserve resources has been an important research agenda. The literature on social capital has analyzed the ways in which social capital facilitates forms of action that are expected to enhance people's livelihoods.

---

[91] Ibid.

[92] Stephen B. Brush, "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity" in Natural Assets: Democratizing Environmental Ownership, James K. Boyce and Barry Shelley, eds. (Washington DC: Island Press, 2003), 187-205.

In the following section, the chapter will proceed with a discussion of two approaches to social capital, the networks approach and the synergy approach. While the networks approach emphasizes the sources of social capital *within* a community, the synergy approach provides a broader framework analyzing the nature of the relationship between government officials and farmers. It is significant to underline the difference between two approaches. As I will discuss in detail, in the synergy approach to social capital, the focus is on state-society relationships and not only the community itself as in the networks approach, and the role of the state as filling the gaps for community networks in the process of providing livelihood services, not imposed from above but complementing the activities of the community is significant. As such, the synergy approach provides significant clues to the design of public policies to conserve crop genetic diversity.

2.4.1. Social Capital and Crop Genetic Diversity

2.4.1.1. Social Capital: The Networks Approach

One of the pioneers of the concept of 'social capital', Robert Putnam, defines it as "features of social organization, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions."[93] Vivien Lowndes and david Wilson summarize the process through which, according to Putnam, social capital will be developed, face-to-face interaction in associations and informal social networks create trust among people, and norms of trust and reciprocity spill over into society at

[93] Robert Putnam, Making Democracy Work, (Princeton NJ: Princeton University Press, 1993), 167.

large, leading to the creation of a capacity for collective action in pursuit of shared goals.[94] Victor Nee notes that norms are considered to be social capital as long as they are able to solve social dilemmas "that would otherwise result in suboptimal collective outcomes caused by individuals pursuing private advantage at the cost of collective goods."[95] Thus, by constraining short-term gains, norms facilitate cooperation.

Identifying the sources of social capital is crucial according to the networks view of social capital, since it is then possible to distinguish the consequences derived from social capital from its sources.[96] Alejandro Portes and Julia Sensenbrenner have explored the roots of social capital in classical sociology as a means to understand better its potential for the field of economic sociology.[97] They define social capital as "those expectations for action within a collectivity that affect the economic goals and goal-

---

[94] Vivien Lowndes,. and David Wilson, "Social Capital and Local Governance: Exploring the Institutional Design Variable" Political Studies 49, 4 (2001), 630.

[95] Victor Nee,"Sources of New Institutionalism" in The New Institutionalism in Sociology, Mary C. Brinton and Victor Nee eds. (New York: Russell Sage Foundation, 1998), 9. Nee defines norms as "implicit or explicit rules of expected behavior that embody the interests and preferences of a close-knit group or a community", 8.

[96] Michael Woolcock and Deepa Narayan, "Social Capital: Implications for Development Theory, Research, and Policy," The World Bank Research Observer 15, 2 (2000): 231-232.

[97] Alejandro Portes,. and Julia Sensenbrenner, "Embeddedness and Immigration: Notes on the Social Determinants of Economic Action," in The New Institutionalism in Sociology, Mary C. Brinton and Victor Nee eds. (New York: Russell Sage Foundation, 1998). This article is included in the Key Readings in Social Capital Theory and Practice (2004), compiled by the contributors to the Symposium: Using Social Capital to Help Integrate Planning Theory, Research and Practice, Journal of American Planning Association. The symposium presents selected contributions to panels held at Association of Collegiate Schools of Planning (ACSP). Alejandro Portes is a professor of Sociology at Princeton University, and the Director of the Center for Migration and Development.

seeking behavior of its members, even if these expectations are not oriented toward the economic sphere."[98] Portes and Sensenbrenner identify the sources of social capital as value introjection, reciprocity exchanges, bounded solidarity and enforceable trust. What is crucial in their approach is the recognition of the positive as well as negative aspects of social capital. While social capital may provide the individual with appropriable resources to use, it may as well constrain action, or divert it from its original goals, and these may reveal themselves as constraints on freedom.[99] Portes and Sensenbrenner note the leveling pressures to keep members of groups in the same situation as their peers as one example. Similarly, in the context of developing countries, Woolcock and Narayan note that for example, poor entrepreneurs, who are initially dependent on their immediate neighbours and friends (their bonding social capital) for credit and support, will require access to more extensive product and factor markets if their businesses expand.[100] However, these entrepreneurs may find that their obligations and commitments to their groups present obstacles to further advancement.[101] Thus, the challenge to social capital theory and policy making is to identify the conditions under which the positive aspects of bonding social capital can be harnessed, and its integrity retained, while the negative aspects can be dissipated.[102]

---

[98] Ibid, 129

[99] Ibid, 139.

[100] Michael Woolcock and Deepa Narayan, "Social Capital: Implications for Development Theory, Research, and Policy," 231-232.

[101] Ibid, 233.

[102] Ibid.

A similar approach to social capital is presented by Jules Pretty and Hugh Ward in the context of natural resource management. They note that social and human capital, embedded in participatory groups within rural communities, has been central to equitable and sustainable solutions to local development problems.[103] Parallel to Portes and Sensenbrenner's discussion of the sources of social capital, Pretty and Ward's definition of social capital comprises relations of trust, reciprocity, and common rules, norms and sanctions. Yet, their account of reciprocity differs from Portes and Sensenbrenner's in the sense that reciprocity and exchanges are seen as increasing trust between individuals, rather than pursuing their selfish ends.[104] Pretty and Ward argue that there is another dimension to the concept of social capital: connectedness, networks, and groups and the nature of relationships are seen as a vital aspect of social capital. They note that there may be different types of connection between groups, such as trading of goods, exchange of information, mutual help, provision of loans, common celebrations. Connectedness need not be manifested only between groups at the local level horizontally, but also can be observed in relation to other groups in society such as vertical connections between local groups and external agencies or organizations.[105] This is particularly significant with regard to relations of farmers groups with government officials who potentially will come up with policies that will directly or indirectly affect farmers' practices.

---

[103] Jules Pretty and Hugh Ward, "Social Capital and the Environment," World Development 29, 2 (2001): 209-227.

[104] Ibid, 211.

[105] Ibid, 212.

In a discussion of rural livelihoods, Anthony Bebbington notes that social capital facilitates forms of action that enhance people's ability to access and defend resources, transform them into income, and access institutions and organizations in the spheres of market, state and civil society in a way that facilitates resource access, defense and transformation.[106] This can take place through actions of rural people (from the inside out), and as an example of this process, Bebbington notes how networks of trust and mutual accountability at the local level can be critical in helping break the problem of access to financial capital.[107] He argues that trust and mutual accountability have been the basis of successful, self-sustaining examples of local banking. Another example comes from Elizabeth Katz, who argues (based on her Guatemalan case study) that long-term networks of trust among natural resource users can substitute for the costly monitoring, supervision, and enforcement of the rules governing property rights and resource use in both private and common property regimes.[108]

Two features of social capital that Katz discusses deserve attention: first, she argues that investments in social capital are often a byproduct of activities engaged in for other reasons than for material gain. As such, social capital is often created outside of the market sphere, since it arises out of human interactions and relationships. Secondly, rather than depleting it, using social capital contributes to its stock.

---

[106] Anthony Bebbington, "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty," World Development 27, 12, (1999), 2037.

[107] Ibid.

[108] Elizabeth Katz, "Social Capital and Natural Capital: A Comparative Analysis of Land Tenure and Natural Resource Management in Guatemala, " Land Economics 76, 1 (2000) : 114-132.

Continuous engagement in collective action reinforces the bonds within a group that provides the context for future action.

The approaches to social capital discussed above can be referred to as the 'networks view'[109], characterized by its emphasis on the sources of social capital. Portes and Sensenbrenner and Katz mainly focus on social capital at the group level, and do not integrate institutions at the societal level (or vertical relations between the community and public officials) into their analysis. Pretty and Ward also put the emphasis on the networks at the community level. Yet, their approach recognizes the importance of vertical relationships, but they do not elaborate on the nature of these relationships. Bebbington notes that in addition to actions of rural people (from inside out), social capital can be created through actions of external organizations (from the outside in)[110], or through synergy between rural people and external organizations. After a discussion of how the networks view of social capital can be linked to crop genetic diversity, I will focus on the 'synergy approach' to social capital, which brings the process of vertical relationships between community groups and public officials to their framework. The synergy approach recognizes the potential of positive state-society relations that the networks approach largely ignores.[111]

---

[109] Michael Woolcock and Deepa Narayan, "Social Capital: Implications for Development Theory, Research, and Policy," 231.

[110] Anthony Bebbington, "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty," 2037.

[111] Michael Woolcock and Deepa Narayan, "Social Capital: Implications for Development Theory, Research, and Policy," 234.

2.4.1.2. The Networks View of Social Capital and Crop Genetic Diversity

How can the networks view of social capital be deployed as an analytical concept to examine rural communities that engage in actions that conserve crop genetic diversity? Robert Rhoades and Virginia Nazarea note that while innovativeness in biodiversity preservation finds its manifestation in experimental farmers, ultimately the social context of local communities shapes *in situ* biodiversity maintenance.[112] Particularly in communities that have not yet been fully integrated into commercial markets and that still cultivate landraces, locally defined social and economic goals determine the protection such genetic resources.[113] Rhoades and Nazarea argue that many indigenous communities with a sense of place, "are aware of the value and role of land and diverse crop inventories to their cultural survival, and communally strive to guard these resources."[114] Based on a case study he conducted in the Andes, Josep-Antoni Gari argues that in the production of the crop 'quinoa', knowledge and resources are exchanged among farmers within communities as well as among communities, neglecting monetary terms and encouraging farmer-to-farmer cooperation to innovate and spread knowledge, and the peasant practices keep the coevolution of quinoa biodiversity.[115] Farmers are embedded in a set of social relations within their

---

[112] Robert E. Rhoades and Virginia D. Nazarea, "Local Management of Biodiversity in Traditional Agroecosystems" in Biodiversity in Agroecosystems, Wanda Williams Collins and Calvin O. Qualset eds. (Boca Raton FL.: CRC Press, 1999), 225.

[113] Ibid.

[114] Ibid.

[115] Josep-Antoni Gari, "Biodiversity Conservation and Use: Local and Global Considerations," Science, Technology and Development Discussion Paper No.7, Center

communities, and production of landraces occurs in the context of a locally shared knowledge about crops, and exchange of seeds. They have developed norms which preclude any single farmer to claim monopoly of ownership of a particular crop or innovation. Brush notes that genetic diversity originated in relatively autonomous subsistence systems, where it was maintained for ecological and cultural purposes, and the local management of crop genetic resources has been in the context of household and village economies, where knowledge and crop varieties are treated as common property rather than as commodities.[116] He gives examples from Peru, Mexico and Turkey, where potato, maize and wheat varieties are exchanged within communities and among households without concern for proprietary control.[117] Farmers, through interactions with one another, build upon and modify the knowledge and technologies which they share, each benefiting from the improvements made by the other.[118] Local knowledge, in this sense, is not just held by individual farmers but by the communities. As such, the networks approach to social capital would propose that these norms, with relations of trust and reciprocity, may provide the social capital that enables farmers to continue practices that maintain crop genetic diversity at the local level.

---

for International Development and Belfer Center for Science and International Affairs, Harvard University,1999, 5.

[116] Stephen B. Brush, "Farmers Rights and Genetic Conservation in Traditional Farming Systems," World Development 20, 11 (1992), 1622.

[117] Stephen B. Brush, "Is Common Heritage Outmoded?" in Valuing Local Knowledge: Indigenous People and Intellectual Property Rights, Stephen B. Brush and Doreen Stabinsky eds. (Washington D.C.: Island Press, 1996), 150.

[118] Ryan Isakson, "Cultivated Genetic Diversity, Traditional Agricultural Knowledge, and Intellectual Property Rights: A Modern Day Enclosure of the Commons?" Unpublished Paper, 2000.

However, changing conditions, such as agricultural modernization, greater access to the market, or destruction of habitats will impact the extent to which farmers will cultivate landraces. Under market pressure, farmers will increasingly rely on high yielding varieties of seeds which modern agriculture uses, thus give up their traditional cultivating practices. For example, in the Philippines, the introduction of high yielding varieties has displaced more than 300 traditional varieties (landraces) that had been the principal source of food for generations.[119] As such, the displacement of landraces is one aspect of the problem. Another aspect from the point of view of conservation of crop genetic diversity is that the farmers under these changing conditions may in fact abandon agricultural production altogether, which is extremely important in the context of conservation, which is dependent on the continuation of agricultural production.

In this framework, public policies that will enable farmers to continue cultivating landraces become all the more crucial. Yet, as the discussion on social capital shows above, public policy interventions should not be just providing individual incentives for the conservation of crop genetic diversity. The question is how to build or maintain the social capital at the community level that sustains landrace cultivation. The synergy approach to social capital provides some clues for this question.

2.4.1.3. Social Capital: The Synergy Approach

In terms of social capital and widening access from the outside in, Bebbington argues that under certain conditions, government actors have been able to widen

---

[119] Lori Ann Thrupp, Cultivating Diversity: Agrobiodiversity and Food Security (Washington D.C.:World Resources Institute, 1998), 24.

resource access and control in rural areas, through a process of 'building' social capital.[120] He notes that in some cases, government has been able to build *synergistic* relationships with local organizations that increase the quality and coverage of the provision of services, which enhanced family assets. Thus, "forms of social capital that improve the collaborative relationship between society and the state, and that embed the state more deeply in networks and types of relationships through which society can hold it to account, can be built from the side of the government in the process of providing critical livelihood services."[121]

2.4.1.3.1 Embeddedness, Polycentricity and Coproduction

In this context, the concepts of polycentric systems and coproduction offer significant insights to the nature of relationships between groups at the local level and governing authorities. In a discussion of the need for the creation of complex, nested systems of governance to preserve biodiversity, Ostrom notes that simple centralized governance units can not have the variety of response capabilities (as well as the incentives to use them) that complex, polycentric governance systems can have.[122] In a polycentric governing structure, each unit exercises independent authority to make and enforce rules within a specified area for particular policy areas, and the smallest unit in

---

[120] Anthony Bebbington, "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty," 2038.

[121] Ibid.

[122] Elinor Ostrom,"Scales, Polycentricity, and Incentives: Designing Complexity to Govern Complexity," in Protection of Global Biodiversity: Converging Strategies, Lakshman Guruswamy and Jeffrey A. McNeely eds. (Durham, N.C.: Duke University Press, 1998).

the structure is nested in a municipal, state and national regime that can complement the activities of citizens organized in these mini-polities.[123] One characteristic of local indigenous institutions is that they are frequently small in size, which enable them to provide services for their members either on voluntary or involuntary basis, through social and moral pressure to enforce rules that limit free riding.[124]

Ostrom defines coproduction as the process "through which inputs used to produce a good or a service are contributed by individuals who are not 'in' the same organization", with the implication that citizens can play an active role in producing public goods and services of consequence to them.[125] Complementarity between public agents and citizens is crucial for the process of coproduction, and incentives that encourage coproduction are easier to develop in a polycentric system in which some of the units are relatively small, and encourage meaningful contact among officials and citizens.[126] The idea is that in a polycentric system, general public policies can be more easily tailored to local circumstances as opposed to a monocentric system, which would

---

[123] Elinor Ostrom, Larry Schroeder, and Susan Wynne eds. Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective (Boulder: Westview Press, 1993), 178.

[124] Ibid.

[125] Elinor Ostrom, "Crossing the Great Divide: Coproduction, Synergy and Development," World Development 24, 6 (1996), 1073.

[126] Ibid, 1082. See Peter Evans "Government Action, Social Capital and Development" World Development 24, 6 (1996): 1119-1132. Evans defines complementarity as "the situation in which public agents and citizens have sufficiently different but equally necessary kinds of inputs for the provision of a public good." In "Government Action, Social Capital and Development" World Development 24, 6 (1996), 1123.

try to establish uniform rules for all settings.[127] Thus, the existence of smaller local units (already in cooperative relations with one another) makes coproduction easier to achieve.

Yet, complementarity is a necessary but insufficient element by itself for coproduction. Embeddedness is crucial for coproduction, Peter Evans argues, as it generates the normative and interactional basis for realizing the potential mutual gains.[128] The idea of embeddedness is based on the work of Mark Granovetter, who, as opposed to undersocialized accounts of human action that neoclassical economics adopts, contends that actors do not behave or decide as atoms outside a social context, nor do they act accordingly to the role determined by a particular intersection of social categories they are occupying, as an oversocialized conception would presume.[129] Instead, actors' attempts at purposive action are embedded in concrete ongoing systems social relations.[130] Evans notes that embeddedness is manifested in the dense network of social relationships between local public officials and local communities. As such, embeddedness is a form of social capital which integrate vertical relationships into analysis.[131] Evans cites a successful irrigation system in Taiwan analyzed by Lam, in

---

[127] Elinor Ostrom, "Crossing the Great Divide: Coproduction, Synergy and Development," World Development 24, 6 (1996), 1082.

[128] Peter Evans "Government Action, Social Capital and Development" World Development 24, 6 (1996), 1123.

[129] Mark Granovetter, "Economic Action and Social Structure: The Problem of Embeddedness" American Journal of Sociology 91, 3 (1985), 487.

[130] Ibid.

[131] Michael Woolcock, "Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework" Theory and Society 27, 2 (1998), 162.

which the multifaceted sets of ties that bind local public officials and local farmers have been important. Officials rely on the experience and local knowledge of the farmers to allocate water among the fields, and to carry out local operations and maintenance, while local farmers depend on their public sector counterparts, as they deliver the 'promised' water to the local area.[132]

Evans notes that corporately coherent Weberian bureaucracies are important in making sure that embeddedness does not degenerate into clientelism. In the Taiwanese case, for example, the robustness of government organization gave the farmers the confidence that the higher levels of the apparatus will in fact deliver the water they have been promised and increased the incentive for forward looking cooperation at the local level.[133] Also, there was a well worked out division of labour within the bureaucracy which left the farmers and local officials free to work out their problems at the local level without interference from above.[134] Evans argues that opportunities for clientelism within a bureaucracy can be constrained by powerful internal norms and a dependably rewarding system of long-term career benefits. Thus, clientelism may show itself as a form of embeddedness, pointing to the possible negative implications of it, which needs to be prevented. Michael Woolcock notes that the presence or absence of a complementary set of autonomous social ties has to be analyzed to understand the costs

---

[132] Peter Evans "Government Action, Social Capital and Development" World Development 24, 6 (1996), 1121.

[133] Ibid, 1126.

[134] Ibid.

and benefits of embeddedness.[135] Autonomous social relations, where necessary, will offset the costs of embeddedness.

The ideas of polycentrism and coproduction with a focus on embeddedness suggest that it is crucial to identify the nature and extent of a community's social relationships and formal institutions and their interaction, and analyze the processes through which the positive aspects of social capital can be deployed to prevent clientelism.: "Put another way, the challenge is to transform situations where a community's social capital substitutes for weak, hostile, or indifferent formal institutions into ones in which both realms complement one another."[136] Thus, the synergy approach to social capital includes both embeddedness and autonomy for successful coproduction strategies.

2.4.1.4. Synergy Approach and Crop Genetic Diversity

As I noted above, a number of studies show that changing conditions, such as agricultural modernization, increasing market access, destruction of habitats will have an impact on the cultivation of landraces. There are three processes by which losses of diversity can occur. First, farmers may decide to convert to the modern varieties of the same crop that they used to plant. Second, farmers can convert to new crops. Lastly, they may abandon farming altogether for non-agricultural occupations, migrate to the cities for better living conditions. In this context, one proposition of the dissertation is

---

[135] Michael Woolcock, "Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework" Theory and Society 27, 2 (1998), 164.

[136] Michael Woolcock and Deepa Narayan, "Social Capital: Implications for Development Theory, Research, and Policy," 238.

that in the conservation of crop genetic diversity, public agencies can be extremely important in the provision of mechanisms that will ensure that cultivation of landraces will meet the needs of rural communities in Turkey. For a successful system of coproduction, the dimensions of complementarity and embeddedness need to be established at the local level.

One significant point that should be emphasized in these efforts is the importance of the recognition of the practices and knowledge of the local communities. Among the components of social capital in relation to crop genetic diversity are the seed exchange practices among the farmers, the local knowledge that they share with each other, as well as the transmission of taste and preferences from generation to generation. At the same time, the provision of sustainable livelihoods in the villages is crucial so that farmers will not abandon the villages for better living conditions elsewhere.

Table 2.3: Two Aapproaches to Social Capital and Agricultural Biodiversity conservation

Social Capital	Perspective	General Policy prescriptions	Agricultural Biodiversity conservation, cultivation of landraces
Networks approach	Bonding and bridging community ties	*Decentralize *Bridge social divides	Reciprocity, Sharing knowledge Collective work at the village for better rural livelihoods
Synergy approach	Community networks *and* state-society relations	*Coproduction, complementarity *participation, *enhance capacity and scale of local organizations	Embeddedness, dense networks between local public officials and farmers cultivating diversity, provided that public officials embrace the idea of the importance of local traditional variety cultivation and value it. Enhancing mechanisms for collective work at the village.

Adapted from Woolcock and Narayan (2000).

For *in situ* conservation of genetic resources, Brush notes that future programs are likely to incorporate three components, research, participatory plant breeding, and community development.[137] In this strategy, the research component is based on both biological and social sciences to study the status and dynamics of genetic diversity and to identify the appropriate areas and mechanisms for conservation. Participatory plant breeding, on the other hand, can improve the value of local crop populations and make them more competitive in increasing food productivity and farmers incomes, and this technique involves farmers and scientists in the identification of outstanding local crop populations, improved seed selection and management, recovery of lost varieties, improved information and seed exchange among farmers, and farmer selection of breeding material developed by scientists.[138] The community development component includes both market and non-market strategies. For example, market mechanisms would include urban markets which could be specialized in relatively high value niches for local crops and produce, non-market strategies include diversity fairs, where local crop varieties are regionally exposed and public prizes, such as school supplies for a village can be used to stimulate participation.[139]

For example, in cases where there is an abandonment of agricultural practices, one of the ways to overcome the push factors in migration might be the provision of public goods in the villages, i.e., healthcare facilities, sanitation etc. In line with the

---

[137] Stephen B. Brush, "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity" in Natural Assets: Democratizing Environmental Ownership, James K. Boyce and Barry Shelley, eds. (Washington DC: Island Press, 2003), 199.

[138] Ibid.

[139] Ibid.

synergy approach to social capital, rather than the direct provision of these goods from top-down, the government can facilitate, or complement the activities of villagers in the local provision of these public goods. As noted above, enhancing sustainable livelihoods in the village can be significant in maintaining agricultural practices, since the major reason for migration is the search for better livelihoods.

2.5. Integrating local factors in the case of Turkey

As I noted above, farmers are embedded in a set of social relations within their communities, and production of landraces occurs in the context of a locally shared knowledge about crops, and exchange of seeds. The networks approach to social capital would propose that these components of social capital, the exchange of seeds, the shared local knowledge at the community level and tastes and preferences enable farmers to continue practices that maintain crop genetic diversity at the local level. However, agricultural restructuring with greater emphasis on markets and efficiency can result in the decrease of cultivation of traditional varieties, replaced by modern, high yielding varieties. Under increasing pressure for production for the market, farmers may convert to modern varieties instead of cultivating traditional varieties, since modern varieties give higher yields. One question that the dissertation will address is how does this emphasis on the market-oriented production influence social capital, since, as Katz argues, investments in social capital are often a byproduct of activities engaged in for other reasons than material gain. She argues that social capital is often created outside of the market sphere. In such a context, the dissertation explores the

possibility of developing public policies that will incorporate farmers (who are the major actors providing crop genetic diversity) to maintain *in situ* diversity.

As such, in terms of public policy suggestions, one proposition of the dissertation is that, based on the synergy approach to social capital, in the conservation of crop genetic diversity, public agencies can be extremely important in the provision of mechanisms that will ensure that cultivation of landraces will meet the needs of rural communities in Turkey. In this context, the nature of the social relationships of the public officials with local communities is very important. By recognizing the local farmers' knowledge and practices that conserve crop genetic diversity, public agencies can be instrumental in developing public policies that will actively engage farmers' groups in the process. Without an understanding of the effect of farm based decisions on genetic variation, national programs will lack the information needed to support or assist farm management of traditional varieties.[140] At the same time, such a framework can be possible if the national capacity of the state to conserve genetic diversity is able to initiate local capacity building practices.

When discussing the research component of the strategy for maintaining crop genetic resources, Brush gives examples from Mexico and Turkey where research has demonstrated that interdisciplinary collaboration between social and biological sciences can identify target areas (where the risk of genetic erosion is high) for *in situ* conservation, and where conservation might be accomplished by incrementally

---

[140] Stephen B. Brush, "In Situ Conservation of Landraces in Centers of Crop Diversity" Crop Science, 35 (1995): 346-354.

increasing the value of landraces to the farmers.[141] Complementing this, participatory plant breeding is another mechanism through which positive linkages can be established between national scientific programs and farmers at the local level.

As noted in the introduction, the third chapter of the dissertation focuses on the conservation practices of crop genetic diversity by the farmers at the local level, looking at the two approaches to social capital (networks and synergy) in the Turkish context. After a brief discussion of the role of the public sector in the conservation of genetic diversity for agriculture, the third chapter explores the possibility of developing public policies that will incorporate farmers to maintain *in situ* diversity. The fourth chapter analyzes the linkages between international institutions/regimes and policy making at the national level in Turkey, with particular attention to conservation of genetic diversity, in the context of implementation of the Convention on Biological Diversity, and the agricultural policies that have been in a process of restructuring as directed by the IMF and the World Bank.

Table 2.4. Different levels for environmental protection

International level	National level	Local level
International regimes/institutions	State	Local

[141] Stephen B. Brush, "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity".

Table 2.5. Conservation of genetic diversity in Turkey

Convention on Biological Diversity **(CBD),** GEF FAO → WTO/TRIPS **IMF/WB**	Norms, policy innovations, technical and financial assistance → Policy priorities	National Capacity of Turkey i. Political and administrative capacity ii. Technical capacity	Local conservation of genetic diversity

Local capacity building

Local knowledge

Social capital

Table 2.6. Actors

CBD, GEF FAO WTO/TRIPS IMF/WB	State bureaucracies Scientists/epistemic communities Environmental NGOs	Farmers who engage in practices that conserve crop genetic diversity

Local agricultural officials

2.6. Methodology

As noted at the beginning of the chapter, the research question that the dissertation is undertaking is: What are the factors that affect the conservation and evolution of crop genetic diversity by the farmers at the local level? In terms of the linkages between factors at different levels, a related question is: How do international and national institutions/regimes affect the capabilities of farmers at the local level to conserve crop genetic diversity? In this context, the dissertation will look at the implementation process of the international biodiversity institution/regime embodied by the Convention on Biological Diversity in Turkey, and its interplay with the neoliberal economic institution/regime fostered by the IMF and the World Bank.

As indicators for implementation of the CBD in Turkey, I will use six indicators proposed by Rosendal. These are: follow up in the form of conservation plans and programmes; symbolic language (consistent use of the same terms); policy instruments aimed at conservation activities; related institutional changes in the government agencies; legislation controlling access to genetic resources; and the participation of the local people in the conservation activities, for example, in plant genetic resources, on-farm conservation.[142] The indicators that I will use for analyzing IMF/World Bank impact include agricultural policy documents and instruments; data on agricultural subsidies, and agricultural terms of trade (agricultural imports and exports, with a particular focus on wheat). At the local level, the indicator for the conservation of crop genetic diversity will be the cultivation of traditional varieties of wheat by the farmers.

---

[142] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries (Dordrecht: Kluwer Academic Publishers), 241-242.

For analysis of the linkages between different levels of factors, the method of process tracing will be applied, which makes it possible to examine multiple observations, and assess which causal mechanisms have been activated.[143] Alexander George and Timothy McKeown note that process tracing is intended to investigate and explain the process by which initial conditions are translated into outcomes.[144] They underline that in case studies, the research interest is not only in a single bit of behavior but in a "stream of behavior through time…Any explanation of the processes at work in the case thus not only must explain the final outcome, but also must account for this stream of behavior."[145] Thus, David Collier notes that according to George and McKeown's conceptualization, through process-tracing, the researcher engages in a close processual analysis of the unfolding of events over time within the case.[146] It should be underlined that while a comparative approach may provide more room for testing hypotheses, the choice of a single case allows an in-depth analysis of the causal mechanisms.

The collection of data for the dissertation has proceeded in two parts. One part includes open-ended elite interviews I conducted with policy makers who participated

---

[143] George King, Robert O. Keohane, and Sidney Verba, Designing Social Inquiry: Scientific Inference in Qualitative Research (Princeton, NJ: Princeton University Press, 1994).

[144] Alexander George, and Timothy McKeown, "Case Studies and Theories of Organizational Decision Making" Advances in Information Processing in Organizations 2 (1985): 21-58.

[145] Ibid, 36.

[146]David Collier, "The Comparative Method" in Political Science: The State of the Discipline, Ada Finifter ed. (Washington D.C.: American Political Science Association, 1993).

in the design of policies for the conservation of biological diversity in general and plant genetic resources in particular, as well as policy makers and implementation officers participating in the restructuring of agricultural policies. These include officials in various departments of the Ministry of Agriculture and Rural Affairs (MARA), Ministry of Forestry (MOF) and Ministry of Environment (MOE), as the national focal point for the CBD in Turkey is the MOE, and the MARA and MOF are the implementing partners. Also, interviews have been conducted with officials in the State Planning Organization (SPO), the Turkish Patent Institute (TPE), Secretariats of Treasury and Foreign Trade. Other than public officials, I have conducted interviews with scientists and representatives of NGOs who have taken part in advisory bodies in the process of formulating policies for the conservation of biological diversity and plant genetic resources. These interviews provide information about the extent and process of the diffusion of CBD norms and policy innovations to the national framework, and the impact of this diffusion in the implementation process in Turkey.

In search for an answer to what the factors are that affect the capability of farmers to conserve crop genetic diversity, I have conducted focused and open-ended interviews with farmers in the Aegean region, Balıkesir province and the Western Transitional Zone, in Eskişehir province in Turkey.[147] Both of these regions are located in the Western part of Turkey. In the Aegean region, wheat is grown with industrial crops, and wheat is an important but not the main crop in the cropping system. In the Western Transitional Zone, wheat is the main crop in the system. Tan notes that the

---

[147] The field work in the Western Transitional Zone have been conducted in collaboration with Anatolian Agricultural Research Institute, Eskişehir.

landraces are still grown in transitional zones and mountain areas, and transitional zones appear to have retained traditional farming methods to higher degree than the intensively cultivated coastal region or Anatolian plateau.[148]

In parts of both regions, particularly in mountainous areas, cultivation of traditional varieties is still continuing along with modern varieties. Yet, these regions differ from each other in important aspects. In the Aegean region, the coastal region, a Mediterranean climate predominates, with short, mild and wet winters and hot long dry summers, whereas in the central region, arid and semi-arid continental climate predominates, where winter conditions can be harsh, with frequent snowfall in the higher parts. Because of the highly variable terrain, and exposure to hot and cold winds, local microclimates can vary widely from the regional averages. The Western coastal region, in general, is economically well developed, and produces industrial crops such as tobacco and cotton, as well as vegetables and fruit, and is integrated with the domestic as well as world markets (particularly in the case of cotton). In the Western transitional zone, it is mainly cereal production and to some extent sugarbeet in areas where irrigation is possible, self-subsistence farming and mainly for the domestic market. With these differences, a comparison of these two regions can provide important insights about how the farmers were affected by the agricultural restructuring taking place, as well as in terms of the conservation of crop genetic diversity.

The choice of the villages have been in three categories: in some of the villages, only modern varieties are cultivated, in some, both modern and traditional varieties are

---

[148] Ayfer Tan, "Agricultural Plant Diversity in Turkey" Paper presented in OECD Expert Meeting on Agri-biodiversity Indicators, Switzerland, 2001.

cultivated, and in others, only traditional varieties are cultivated. In order to avoid selection bias, namely, constraining variation on the dependent variable by focusing on a single outcome, I have conducted interviews with farmers who cultivate only modern varieties, who cultivate both modern and traditional varieties, and who cultivate only traditional varieties.[149] These interviews provide information about the perceptions of the farmers of the importance and the value of traditional varieties at the local level, and what factors the farmers identify as contributing or preventing their cultivation of traditional varieties. These interviews also have focused on the social relations within the village, as well as the farmers' relations with local public officials.

Another set of data I will use includes written documentation, the national legislation, reports and programs regarding the conservation of biodiversity and plant genetic resources, and the legal decrees in relation to agricultural restructuring in Turkey, which provide the legal context in which the design of policies that are expected to affect the land use decisions of farmers take place.

The mode of analysis for analyzing evidence will be pattern-matching, comparing an empirically based pattern with a predicted one, or several alternative predictions, as offered by different theoretical approaches outlined earlier in the chapter. For example, in terms of the implementation stage of the CBD in Turkey, the realist approach would predict that the existence of a hegemon, which will provide rewards or sanctions, will influence whether or not a state (i.e. Turkey) will implement the CBD

---

[149] If the interviews were only made with farmers who cultivate traditional varieties, then the research would be focusing on the high end of the dependent variable, the conservation of crop genetic diversity, causing selection bias.

obligations at the national level. On the other hand, the neoliberal institutionalist approach would predict that a party to the CBD would implement the activities outlined by the CBD in accordance with its cost-benefit calculations based on the incentives provided by the CBD, focusing largely on material incentives. The constructivist approach would predict that a party would engage in implementation activities as a consequence of the process of learning through the diffusion of the norms and policy innovations of the CBD, even in the absence of sanctions. According to this approach, the international institutions/ regime embodied by the CBD may provide the space for epistemic communities to incorporate their input into the domestic policy making process for conservation activities. I will compare the empirically based pattern between an independent variable (that is, the Convention on Biological Diversity) and the dependent variable (conservation of crop genetic diversity) to a number of theoretically predicted patterns, and these predictions made through the various stages of the process under examination will increase the number of observations within the single case study. If the patterns coincide, internal validity of the case will be strengthened.

CHAPTER 3

SOCIAL CAPITAL AND THE CONSERVATION OF CROP GENETIC DIVERSITY BY THE FARMERS AT THE LOCAL LEVEL IN TURKEY

3.1. Introduction

Scholars writing about crop genetic diversity underline the significance of *in-situ* (on site) practices. For thousands of years, farmers "have selected and saved landrace varieties of the crops that humans consume today."[1] However, due to a number of factors, such as introduction of modern varieties or exotic crops, land conversion to industrial agriculture, and destruction (urbanization) of habitat and farmland, genetic diversity is eroding.[2]

Turkey is the center of origin and center of diversity of several crop plants (including wheat and barley), as well as one of the domestication centres where ancient agriculture started. As part of the agricultural modernization that took place in the 1950s and 1960s, high yielding varieties of seeds (or, highly fertilizer responsive varieties) are predominantly used by Turkish farmers. However, due to a number of factors, such as the fertility of soil, distance to the market, or the taste of the product, local landraces are also cultivated. For example, the probability of cultivation of traditional varieties

---

[1] George B. Frisvold and Peter T. Condon, "The Convention on Biological Diversity and Agriculture: Implications and Unsolved Debates," *World Development* 26, 4 (1998), 552. I will use landraces and traditional varieties interchangeably.

[2] Ayfer Tan, "Current Status of Plant Genetic Resources Conservation in Turkey," in Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity, N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. (Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998).

(landraces) increases when the agricultural plot is situated in less fertile soil, or when the distance to the market and bad road quality increase the costs of accessing markets.[3] The traditional varieties are mainly produced to meet consumption needs of the producer and not for the market. Currently, there are no public policies aimed at the cultivation of landraces, thus, their production depends to a large extent on the continuation of existing structures.

This chapter aims to address the question of what are the factors that affect the cultivation of traditional varieties by the farmers. After a discussion of the role of the public sector in the conservation of genetic diversity for agriculture, the chapter will analyze the agricultural practices of wheat farmers in the Western region in Turkey in the context of conservation of crop genetic diversity. Through an analysis of these practices in light of the literature on social capital, the chapter will explore the possibility of developing public policies that will incorporate farmers (who are the major actors providing crop genetic diversity) to maintain *in-situ* diversity. The chapter will propose that, under conditions of increasing market access in Turkey, a coproduction strategy which will bring government officials and farmers together can be crucial in the continuation of the practice of cultivating traditional varieties.

---

[3] Stephen B. Brush and Erika CH Meng, "The Value of Wheat Genetic Resources to Farmers in Turkey," in Agricultural Values of Plant Genetic Resources, Robert E. Evenson, Douglas Gollin, and Vittorio Santaniello eds. (Wallingford, UK; New York: CAB International, 1998).

3.2. The Role of the Public Sector in the Conservation of Genetic Resources for Agriculture

Crop genetic diversity provides the raw material needed for future crop adaptations to changing pests, pathogens and environmental conditions, thus increases resistance and resilience of crops.[4] Farmers in developing countries have been producing landraces, the major component of crop genetic diversity, and the substantial base of resources for agricultural research and development (R&D). This agricultural R&D is currently undertaken by public research institutes (which own seed collections or 'gene banks') and the private sector (the seed industry). Modern agriculture, however, is characterized by a higher degree of varietal uniformity than traditional agriculture. While this uniformity facilitates productivity, at the same time, it increases vulnerability to large scale crop failures due to plant disease and pest epidemics.[5]

The significance of the complementarity between *in situ* diversity (as represented by crop varieties planted in farmers' fields) and *ex situ* diversity (as represented by collections in gene banks) is emphasized by scholars writing about crop genetic diversity. Yet, *in situ* diversity created by farmers in the field through cultivation of traditional varieties is declining as farmers increasingly prefer modern varieties that outperform the traditional varieties in terms of yields. In recent times, Timothy Swanson notes, expected average yield is the fundamental criterion used in the determination of vast majority of crop choice and land use decisions by individual

---

[4] James K. Boyce, "Ecological Distribution, Agricultural Trade Liberalization, and In Situ Genetic Diversity," Journal of Income Distribution 6, 2 (1996): 265-286.

[5] Ibid, 268.

farmers.[6] The increasing difference in the mean yields of modern and traditional varieties is leading the farmers to convert away from investments in diversity.[7] As such, individual farmers may not have sufficient personal incentive to maintain socially valuable goods, such as genetic resources.[8]

Certain forms of value are less susceptible to capture through the markets. They are thus termed 'external' to the market or 'externalities', as when an individual or firm takes an action but does not receive all the benefits (positive externalities).[9] Because of this, Swanson argues, there is little incentive for industries to form around the production of these values.[10] Timothy Swanson and Timo Goeschl note it is not clear that the private sector will identify and supply goods and services that society demands to the socially optimal extent.[11] Agricultural R&D firms report that a single product

---

[6] Timothy Swanson, "The Source of Genetic Resource Values and the Reasons for Their Management," in Agricultural Values of Plant Genetic Resources, Robert E. Evenson, Douglas Gollin, and Vittorio Santaniello eds. (Wallingford, UK; New York: CAB International, 1998).

[7] Timothy Swanson, "Global Values of Biological Diversity: The Public Interest in the Conservation of Plant Genetic Resources for Agriculture," Plant Genetic Resources Newsletter 105 (1996): 1-7.

[8] Stephen B. Brush, "The issues of in situ conservation of crop genetic resources," in Genes in the Field: On-farm Conservation of Crop Diversity, Stephen B. Brush ed. (Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000), 1-28.

[9] Joseph E. Stiglitz, Economics (New York: W.W. Norton, 1997). Negative externality occurs when an individual or firm takes an action but does not bear all the costs.

[10] Timothy Swanson, "Global Values of Biological Diversity: The Public Interest in the Conservation of Plant Genetic Resources for Agriculture,"

[11] Timothy Swanson and Timo Goeschl, "Optimal Genetic Resource Conservation: In Situ and Ex Situ," in Genes in the Field: On-farm Conservation of Crop Diversity, Stephen B. Brush ed. (Rome: International Plant Genetic Resources Institute; Ottawa,

cycle lasts around 7 years (referring to the time it takes for a given crop variety to become economically nonviable due to the development of resistance).[12] With a standard private sector discount rate of 10%, Swanson and Goeschl note that this would imply that an average R&D firm would have little interest in conserving germplasm to supply agriculture beyond one or two product cycles.[13] What is important for the private R&D firms is the supply of information and not the conservation of any given stock. Thus, the private industry does not have the long-term perspective necessary for the maintenance of crop genetic diversity into the distant future. Also, the private sector focuses on particular major crops that would ensure market profitability. Thus, the conservation of crop genetic diversity is a function that must be supplied by the government. Swanson and Goeschl argue that the range of instruments available to the government for this purpose are direct conservation through *ex situ* policies, and direct intervention in farming practices through *in situ* policies.[14]

This chapter will focus on the *in situ* conservation of crop genetic diversity by the farmers. Through the cultivation of landraces, these farmers produce a positive externality. Farmers receive no reward for producing this positive externality or compensation for the costs of producing or maintaining it. Yet, it should be noted that this production takes place in a social and cultural context. A top-down, direct

---

Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000), 165-192.

[12] Ibid.

[13] Ibid.

[14] Ibid.

intervention of government in farming practices as suggested by Swanson and Goeschl, aimed at the conservation of crop genetic diversity, without the recognition of the ongoing practices within the community, can have destructive effects on the local practices of the communities.

I will evaluate the practices of farmers of cultivation of landraces in light of two approaches in social capital literature. I noted in the previous chapter that the networks approach to social capital would propose that the components of social capital, such as the exchange of seeds, shared local knowledge at the community level and tastes and preferences enable farmers to continue practices that maintain crop genetic diversity at the local level. However, agricultural restructuring with greater emphasis on markets and efficiency can result in the decrease of cultivation of traditional varieties (landraces), replaced by modern, high yielding varieties. Under increasing pressure for production for the market, farmers may convert to modern varieties instead of cultivating traditional varieties. In such a context, in terms of public policy suggestions, one proposition of the dissertation is that, based on the synergy approach to social capital, in the conservation of crop genetic diversity, public agencies can be extremely important in the provision of mechanisms that will ensure that cultivation of landraces will meet the needs of rural communities in Turkey.

One point that Stephen B. Brush and Erika Meng note is that the cost of *in situ* conservation is the "cost of assisting the necessary number of farms in key farming systems to maintain local resources and knowledge in order to maintain the crop

evolutionary system of the centre of agricultural biodiversity."[15] The goal of *in situ* conservation, they propose, is not to preserve a given number of genotypes, but to maintain an agricultural system which generates crop genetic resistance in a manner similar to the historic system. Thus, the main aim of *in situ* conservation should be to locate sites to represent a sample of the general ecogeographics zones of the crop in its centre of origin or diversity.[16] As such, the extent of public involvement in the conservation of diversity will be focused on, if not confined to, these sites.

3.3. Crop Genetic Diversity in Turkey

Turkey falls within the Vavilov centers of crop genetic diversity. Studies on *in situ* diversity in Turkey have mainly focused on wheat, yet farmers practices have been maintaining the genetic diversity of other crops too, such as beans, lentils, and chickpeas. Alptekin Karagöz and Nusret Zencirci note that Southeast Anatolia is known as the primary center of wheat diversification and the area of first wheat domestication, and since the beginning of 20th century, variation in Turkish wheat has received great attention.[17] Genetic resources from Turkey, Braun et al. state, have contributed greatly

---

[15] Stephen B. Brush and Erika CH Meng, "The Value of Wheat Genetic Resources to Farmers in Turkey," in Agricultural Values of Plant Genetic Resources, Robert E. Evenson, Douglas Gollin, and Vittorio Santaniello eds. (Wallingford, UK; New York: CAB International, 1998), 109.

[16] Ibid.

[17] Alptekin Karagöz and Nusret Zencirci, "Variation in Wheat (triticum spp.) landraces from different altitudes of three regions in Turkey," Genetic Resources and Crop Evolution, forthcoming, (2004).

to the development of wheat production in many countries.[18] For example, one Turkish wheat landrace was found to carry genes for resistance and tolerance to various rusts, smuts and other fungal pathogens, and it was used as a source of resistance genes and is a parent of many of the wheat cultivars now grown in the northwestern United States.[19] Another example is cultivar Sarogolla, a once widely grown durum wheat in Italy, which also originated from Turkey.[20] Landraces and wild crop relatives from Turkey continue to provide new sources of important traits needed to maintain and improve agricultural production and efficiency worldwide.[21]

Mirza Gökgöl, the pioneer of the study on Turkish wheat, collected and described wheat types grown in Turkey in the 1930s, and published two volumes in 1935 and 1939. In these years, in Eskişehir and Ankara, activities in wheat were focused on variety improvement, whereas Gökgöl, based in Istanbul, was collecting, characterizing and evaluating cultivated Turkish landraces.[22] He described 17 morphologically different types of T. durum, 10 types of T. *turgidum*, 2 types of T.

---

[18] See Hans-Joachim Braun, Nusret Zencirci, Fahri Altay, Ayhan Atlı, Muzaffer Avcı, Vehbi Eser, Mesut Kambertay, and Thomas S. Payne, "Turkish Wheat Pool," in The World Wheat Book: A History of Wheat Breeding, Alain P. Bonjean and William J. Angus eds. (Paris: Lavoisier Publishing, 2001): 851-879.

[19] Food and Agriculture Organization of the United Nations, The State of the World's Plant Genetic Resources for Food and Agriculture (Rome, 1998).

[20] Mirza Gökgöl, *Türkiye'nin Buğdayları* (Turkey's Wheat) (Tarım Bakanlığı Istanbul Yeşilköy Tohum Islah ve Yetiştirme Enstitüsü, 1935).

[21] Ertug Fırat and Ayfer Tan, "Turkey Maintains Pivotal Role in Global Genetic Resources," Diversity 11, 1&2, (1995): 61-63.

[22] Hans-Joachim Braun, Nusret Zencirci, Fahri Altay, Ayhan Atlı, Muzaffer Avcı, Vehbi Eser, Mesut Kambertay, and Thomas S. Payne, "Turkish Wheat Pool,"

Polonicum, 2 types of T. *persicum*, 11 types of T. *aestivum*, and 3 types of T. *compactum*. Gökgöl evaluated and purified this collection under both spring and autumn sown conditions at Istanbul, Adapazarı, and Eskişehir, and characterized the dominating wheat types of the wheat growing zones of Turkey. In total, he described more than 36,000 indigenous wheat accessions, and concluded that Turkish wheats represent an inexhaustible source of diversity, adding that European and American breeders work with "squeezed lemons" when compared to Turkish breeders, the genetic variability of their material is severely limited, and in many regions, landraces have disappeared, as such, emphasizing the importance of conservation of genetic resources.[23] Braun et al. note that, unfortunately, this advice was not heeded, and Gökgöl's collection was abandoned and destroyed in 1960s.Today, only *T. aestivum*, *T. compactum*, and *T. durum* are cultivated, aside from the einkorn and emmer[24], which are of limited importance.

There are no statistics on the cultivation of landraces, but some estimations with reference to the area that they are being cultivated. In 1990, Feyyaz Uysal published a book on the cultivation of varieties of wheat and barley, and according to his calculations, the area of cultivation of landraces of wheat, (bread and durum), made up

---

[23] Mirza Gökgöl, *Türkiye'nin Buğdaylari*, quoted in Hans-Joachim Braun, Nusret Zencirci, Fahri Altay, Ayhan Atlı, Muzaffer Avcı, Vehbi Eser, Mesut Kambertay, and Thomas S. Payne, "Turkish Wheat Pool,"

[24] Hans-Joachim Braun et al. note that until the third millenium B.C., hulled wheats: einkorn and emmer were the main wheat species grown and consumed in Anatolia, but later, club (*T. aestivum* spp. *compactum)* and non-club bread wheat surpassed hulled wheats' importance. Better yield response of modern bread wheat to fertilizer and the unwillingness of grain merchants to buy minority crops are among the reasons for farmers to give up einkorn and emmer cultivation today. See Hans-Joachim Braun et al. "Turkish Wheat Pool,"

17.4 % of total area of wheat cultivation, with a total of 1,609,669 ha.[25] Today, approximately 1 million ha are still cultivated with *Triticum*-most of them being *T. aestivum* or *T. durum*-landrace populations or selections from landraces in Turkey.[26] According to this estimation, this makes up around 10.7 % of the total wheat area cultivated today.

Based on research on the genetic diversity of wheat in the Western Transitional Zone of Turkey, Brush indicates that while high yielding varieties of seeds predominate, local landraces are still cultivated in the production zones studied.[27] The probability of cultivation of traditional varieties in a given household increases when the agricultural plot is situated in less fertile soil, or when the distance to the market and bad road quality increase a household's cost of accessing markets.[28] Brush identifies four factors as the causes of the practice of *in situ* conservation of traditional crops: "First, fragmentation of land holdings allows farmers to manage several fields and to cultivate landraces in at least one field. Second, marginal agronomic conditions, especially steep slopes and heterogeneous soils of mountain agriculture, make landraces competitive with improved cultivars, at least in that part of the ecosystem. Third, economic isolation

---

[25] Feyyaz Uysal, *Türkiye'de Buğday ve Arpada çeşitler Itibariyle Ekilişler* (Cultivation of Wheat and Barley varieties in Turkey), (1990).

[26] Hans-Joachim Braun et al. "Turkish Wheat Pool,"

[27] Stephen B. Brush, "*In situ* Conservation of Landraces in Centers of Crop Diversity," Crop Science, 35, (1995), 350.

[28] Stephen B. Brush and Erika CH Meng, "The Value of Wheat Genetic Resources to Farmers in Turkey," in Agricultural Values of Plant Genetic Resources, Robert E. Evenson, Douglas Gollin, and Vittorio Santaniello eds. (Wallingford, UK; New York: CAB International, 1998), 101.

creates market imperfections and lessens the competitive commercial advantage of improved cultivars. Fourth, cultural identity and preference for diversity cause farmers to maintain landraces."[29] The traditional varieties are mainly produced to meet consumption needs of the producer and not for the market, as these are ranked higher in taste and baking quality, but not in yield attributes when compared to modern varieties.

Meng et al., underline that to ensure the continuing cultivation of landraces, a network of households should be maintained in such a way that seed exchange and other community-level activities continue to take place.[30] Also, the involvement of additional households in the cultivation of landraces provides insurance against the possibility that the landrace disappears completely.[31] Thus, it is crucial to build on the social capital of farmers and design policies that will encourage farmers who are already cultivating traditional varieties as well as other farmers to start cultivating them.

The following section presents the findings of the fieldwork I conducted, with the aim to address the question of what are the factors that the farmers identify as affecting their cultivation of landraces. The cultivation of traditional varieties is used as a proxy for the conservation of crop genetic diversity. However, before that, I will

---

[29] Stephen B. Brush, "*In situ* Conservation of Landraces in Centers of Crop Diversity," Crop Science, 35, (1995), 351.

[30] Erika CH Meng,, J. Edward Taylor, and Stephen B. Brush, "Implications for the conservation of wheat landraces in Turkey from a household model of variety choice," in Farmers, Gene Banks and Crop Breeding: Economic Analysis of Diversity in Wheat, Maize and Rice, Melinda Smale ed. (Dordrecht: Kluwer Academic Publishers, 1998), 140.

[31] Ibid.

present a very brief summary of the agricultural policies in Turkey so that the findings of the fieldwork can be put into context.[32]

3.3.1. Agricultural Reform Policies in Turkey

During the 1980s, supported by the IMF and the World Bank, structural adjustment policies were implemented in Turkey, with these institutions underlining that state subsidies burdened the economy.[33] Those adjustment policies were intended to increase production and exports, without touching the structural specifics of the Turkish countryside, and for reduction of subsidies and state controls, reliance on market forces and the improvement of agricultural technology were considered necessary.[34] Zülküf Aydın notes that the desired type of producer in these reforms was a technically informed, market-oriented small producer, who utilizes recent technology but shoulders all the increasing costs of modern inputs without challenging increasing prices.

Yet, these reforms were implemented partially. Political and economic events influenced the protection that was provided to agricultural commodities, particularly in

---

[32] A more elaborate discussion of IMF/WB directed agricultural restructuring will be presented in Chapter 4.

[33] Zülküf Aydın, "The World Bank and the Transformation of Turkish Agriculture," in The Political and Socioeconomic Transformation of Turkey, Atilla Eralp, IbrahimTünay and Birol Yeşilada eds. (Westport: Praeger Publishers, 1993), pp.111-134.

[34] Ibid. Measures were taken to let prices adjust to world prices, eliminate fertilizer subsidies, remove restrictions on exports, make agricultural sale cooperatives financially self sufficient with credit obtained on commercial terms etc. See Zülküf Aydın, "The World Bank and the Transformation of Turkish Agriculture,"

election periods.[35] Aydın notes that policies implemented in agriculture between 1980-2000 oscillated between the requirements of the minimization of the state and legitimacy concerns in the countryside.[36] For example, there were fluctuations in policies regarding price supports. First, the list of supported crops was reduced and priorities shifted from traditional crops to industrial ones. Yet, after 1990, the coverage of price support widened again. As such, until the mid-1990s, Fatma Doğruel, Suut Doğruel and Erinc Yeldan note, Turkish agricultural support policies mainly rested on direct interventions to input and output prices.[37] As basic tools, subsidies in input prices, subsidized bank credits, and floor prices were employed to support agricultural activities, and in some cases, government would enter the market as the supplier of inputs and buyer of the agricultural products in order to regulate agricultural production.[38] In the case of wheat production, Nursen Albayrak notes that because of the importance of wheat as Turkey's leading agricultural commodity, the government has long intervened in the sector via the instruments noted above.

However, a dramatic change in the sector came with the recent agricultural restructuring directed by the IMF and assisted by the WB, which replaces the overall

---

[35] Tülay Yıldırım, W. Hartley Furtan and Alper Güzel "A Theoretical and Empirical Analysis of Wheat Policy in Turkey," in World Agricultural Trade, Tülay Yıldırım Andrew Schmitz and W. Hartley Furtan eds. (Boulder, Colo.: Westview Press, 1998).

[36] Zülküf Aydın, "The New Right, Structural Adjustment and Turkish Agriculture: Rural Responses and Survival Strategies," The European Journal of Development Research 14, 2 (2002): 183-208.

[37] Fatma Doğruel, Suut Doğruel and Erinc Yeldan, "Macroeconomics of Turkey's agricultural reforms: an intertemporal computable general equilibrium analysis," Journal of Policy Modelling 25 (2003): 617-637.

[38] Ibid.

existing system of agricultural support with direct income system (DIS). The aim of this market-oriented reform is the withdrawal of the state from agriculture through "reducing the artificial incentives and government subsidies, and substituting a support system that will give agricultural producers and agro-industry incentives to increase productivity in response to real comparative advantage".[39] The DIS comprises of payment of a certain amount of money to the owners of agricultural land per hectare. Starting in 2001, the DIS program has made annual payments of approximately 90 $ per hectare to the farmers who benefited from the program. Initially, the payment was made to owners of land up to 20 hectares. After two years of implementation, the limit was raised to 50. The aim of the limits is based on the objective of supporting small farmers. These agricultural reforms provide the background that the interviews below will be evaluated.

3.3.2. Crop Genetic Diversity in the Western Region in Turkey

As noted in the previous chapter, I have conducted focused and open-ended interviews with farmers cultivating wheat in the Aegean region and the Western Transitional Zone in Turkey.[40] In parts of these regions, cultivation of traditional

---

[39]World Bank, Turkey-Agricultural Reform Implementation Project (ARIP), Project Information Document, Report No. PID9405. (2002). (http://www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2000/08/18/000094946_00081705310273/Rendered/PDF/multi0page.pdf).

[40] I have consulted the Aegean Agricultural Research Institute (AARI) in Menemen, Izmir, which is the official agency responsible for the conservation of plant genetic resources, with the largest *ex situ* facilities in Turkey. The field work in the Western Transitional Zone have been conducted in collaboration with the Anatolian Agricultural Research Institute in Eskişehir.

varieties is still continuing along with modern varieties. These interviews provide information about the perceptions of the farmers as to the importance and the value of traditional varieties at the local level, and what factors the farmers identify as contributing or preventing their cultivation of traditional varieties. These interviews also have focused on the social relations within the village, as well as the farmers' relations with local public officials. I have also conducted interviews with the agricultural public officials in the local offices of the Ministry of Agriculture and Rural Affairs (MARA), who are responsible for the various programs regarding agricultural production, such as how to fight crop diseases, agricultural extension programs etc.

The interviews were carried out in the period between June 2002 and September 2002, in five villages that are within the borders of the city of Balıkesir, the Aegean Region, the western coastal part of Turkey, and in nine villages within the borders of the city of Eskişehir, the Western Transitional Zone, in between the central Anatolian plateau and the coastal region. I revisited some of the villages in the summer of 2003.

3.3.2.1. Eskişehir, the Western Transitional Zone[41]

3.3.2.1.1 Modern Varieties

In four villages, which are about 12-35 km. away from the center of Eskişehir, the traditional wheat varieties are not planted. They were abandoned about 20-30 years ago, when the modern varieties were introduced. These are villages located in the Alpu valley, and their main production is cereal production, and in areas that can be irrigated,

[41] I conducted interviews in nine villages.

sugarbeet. The number of households in these villages vary from 120-400. For the most part, farmers own their own land, some of them engage in sharecropping or pay a rent, but these also have a small land of their own. And there were few farmers who did not own any land but were paying rent. Yet, all of these farmers indicated that they were the ones who decided what should be cultivated in the land, even if they do not own the land. The area of wheat cultivation per farmer ranges from 30 decares to 200 decares.[42] Most of the farmers also cultivate sugarbeet in changing amounts from 10 decares to 80 decares. The yield from the modern varieties of wheat ranges from 250kg-600kg. per decare, with an average of 400kg. The main reason that the farmers indicated for using the modern varieties rather than traditional varieties is the yield. Some of the farmers indicated that they had to continue to use the old seed that they had bought some years ago, and the yield from those varieties have gotten worse, but since they do not have money to buy new seed, they just use this old seed. Irrigation is partly possible as the Agricultural Institute had built water channels some years ago. In one of the villages there was an irrigation cooperative, and they are irrigating by using underground water.

3.3.2.1.2. Modern and Traditional Varieties

As I arrived to villages on the hillside and mountains, farmers cultivate both traditional and modern varieties of wheat. In four villages, the area of wheat cultivation ranges from 20 decares to 100 decares, but it is mainly between 40-50 decares on

---

[42] One decare is roughly equivalent to a quarter of an acre. The farmers interviewed mostly use the term dönüm, which officially is defined as decare, yet this should be taken as a rough measurement rather than strictly precise.

average. For example, if a farmer cultivates 30 decares of wheat, 10 decares of that would be the traditional variety. The main reason for cultivating the traditional variety, which is called sünter, is that it provides an insurance against possible losses from the modern variety depending on the weather conditions, etc. They can sow the traditional variety in the spring. In the words of one farmer planting it: "Its bread tastes great, its quality is good. What else would I want?" Another farmer: "The bread of sünter is very valuable. When you cook it, it smells like flower. You would smell it from kilometers away." One farmer responding to why he is planting the traditional variety said: "I do not know what will happen to me tomorrow. But I know I have to provide food to my family. I plant sünter in part of my field, so I know there is going to be enough food." Many farmers indicated that the taste and the quality of its bread is much better than the modern variety, so they make their bread from the traditional variety, however, they sometimes mix it with the modern variety to have enough bread. But it is mainly for their own consumption. The farmers say that the modern variety is demanded from the market.

Another characteristic of the traditional variety underlined by the farmers is its resistance to diseases, and weather conditions. One problem of the traditional variety is that it is soft, so easily eaten by wild boars. The yield from the traditional variety is around 150 kg per decare. In good years (when there is enough rain), as farmers say, it may go up to 300kg. The modern varieties give a yield around 200-250kg. Some of the farmers in the villages had started planting the modern variety along the traditional variety quite recently, two-to- five years ago, for increases in yield and better prices in the market. For example, in one of the villages, I talked to 10 farmers, which has a total

of 50 households, 7 of the farmers cultivated traditional varieties along with modern varieties, and six of the total 10 indicated that they started using modern varieties in the last 2-5 years.

3.3.2.1.3. Only Traditional Variety

The cultivation of only traditional varieties takes place in one mountain village, with a total of 28 households. In this village, animal husbandry is an important means to sustain their livelihoods. The average area for wheat production is 25-30 decares. They use only traditional varieties, because they are the most suitable to the conditions, especially winter weather in the high hills. Some of the farmers called it the mountain wheat. It is resistant to aridity. One farmer said: "This is the mountain. You can not bring the crop easily to hand. You have to plant the seed at the right time, and know what you should plant. If you plant it timely, you will have the crop, if not, you will not. The boars are a great problem. You do not know how tired I am because of these boars". The farmers are using the traditional variety for their own consumption. Again, it was indicated that the private purchasers in town do not want to buy the traditional variety, and that there was a price difference. The yield is 100-120kg per decare. Out of five farmers I talked to, four of them used manure as fertilizer, and only one used both chemical fertilizers and manure.

The grain merchants in the grain stock market based in the center of Eskişehir also verified that there would be a price difference between different varieties of wheat. However, they also noted that it has been a long time that a traditional variety had last been brought to the market. So the value that they have given is an estimation of what they would give in case a traditional variety came. For example, for the modern variety,

the price would be 405,000 TL (turkish lira)/kilogram, for the traditional variety, it would be 380,000 TL/kilogram. The price is difference is approximately 25,000TL/kilogram.

To summarize, in Eskişehir villages, the farmers in the villages in the valley have long abandoned the traditional varieties, replacing them with the modern varieties because of higher yields that they can get. In the hillside and mountain villages, in the last five years, some farmers have started planting modern varieties along with the traditional varieties, and the area distributed among the different varieties changes, but in many cases modern varieties account for 2/3 of the total area of wheat cultivated. The traditional variety is mainly seen as the principal means to ensure having enough food to eat against possible crop losses from the modern variety, and the quality of their bread and their adaptation to the environment are underlined as significant. But in terms of the yield and being able to sell their products in the market, the modern varieties have an advantage.

When asked about how the recent changes in agricultural policy affected them, almost all of the farmers indicated that they are not able to pay money for the inputs, such as fertilizers and gas, as well as modern varieties of seeds. Yet, one interesting trend is that they do not necessarily revert to traditional varieties when they can not afford to buy new seed. Some farmers would rather plant the old modern variety (sometimes older than four years) despite the perception that the yield will decrease from it, since it is still seen as a better alternative than the traditional variety.[43] Most of

[43] However, a couple of farmers in the valley villages where the cultivation of traditional varieties had long been abandoned noted that if they had access to the traditional varieties, they would use them but that they can not find them any longer.

the farmers had received the direct income, and many of them said that they could not invest the money for production purposes but either partially paid their debt from previous years, or for example for the education for their children.

About recent trends in migration from the villages, there has been some migration in the past 10-15 years, but this had stopped in the last two years, because of the limitations in finding income in the cities due to economic crisis. There was some reverse migration, mainly retired people from the cities came back to their villages, but these were very few in number. Almost every household has a member outside the village who earns income from the town or city. Especially, the younger population does not have any motivation to stay in the village. In terms of carrying the traditional knowledge about the landraces to the younger generations, this may be a problem, because almost all of the farmers who continue to cultivate the traditional varieties are the older generation: the youngest would be 45, but generally they are 55-75 years old.

In the interviews, I also asked the farmers if there were any changes in the amount of area in which they are cultivating wheat. A majority of the farmers said there was a significant decrease, in some cases, almost half of the land that they used to plant they are not planting anymore. Yet, it is not possible to give precise figures with regard to this decrease. The official statistics do not show a decrease for Eskişehir in terms of the area for wheat cultivation. In 2003, according to the Eskişehir province authority's figures, the area for wheat production was 175,990 ha.[44]

---

[44] However, I have to note that these figures need to be considered cautiously. In different official sources (SIS and Eskişehir province authority I note above), the area sown for certain years differ from one another. Even though SIS data should be the

Table 3.1. Wheat production indicators in Eskişehir

Eskişehir	1981	1991	2001
Area sown (ha)	158,931	171,559	174,727
Production (tons)	342,144	444,192	379,576
Yield	2153	2602	2172

State Institute of Statistics (SIS), Agricultural Production.

Average growth rate	Area sown	Production	Yield
1981-1991	0.7%	2.6%	1.9%
1991-2001	0.2%	-1.6%	-1.8%

3.3.2.2. Balıkesir, the Aegean Region[45]

3.3.2.2.1. Modern Varieties

In two of the villages, which are located in the valley and very close to nearby towns, there are no traditional varieties of wheat being cultivated, but all modern varieties. In these villages, other crops cultivated include tobacco (though the villagers noted that the area that being cultivated decreased because of the recent area limitation put by the government for tobacco cultivation); and fruits and vegetables, especially tomatoes in one of the villages because of a nearby tomato paste factory. Both of these villages are well integrated to the market, and they have abandoned traditional varieties of wheat since the 1970s. The main reason for the cultivation of the modern varieties is again their yield attributes. The yield in these villages per decare is approximately 500kg, which the farmers attribute to the quality of their soil. In some years, they have been able to get 750kg per decare. They are able to sell their produce from the modern

---

most reliable, for example, Prof. Oyan notes the unreliability of labor force data, including share of agriculture in employment that SIS publishes.

[45] I conducted interviews in five villages.

varieties in the market, and the majority of the farmers in these villages noted that they do not make their own bread but buy it. They usually buy the modern variety seed from the State Agricultural Institute, or private sellers. However, at times when the price of the seed goes up, they buy from each other, from the farmers in their village who have better seed.

When asked about the impact of the new agricultural policies, the majority of the farmers interviewed indicated that the prices for inputs such as fertilizers and diesel oil have increased, and that they are not able to purchase credits from the Agricultural Bank of Turkey as they used to pay for these inputs. These inputs are mainly used for the production of vegetables, and some farmers predicted that they may revert to planting more wheat instead of vegetables. Yet, this wheat will be the modern varieties, particularly Cumhuriyet variety which has the most demand from the market. Irrigation arrangements exist in these villages, and they can get two (and sometimes three) crops from their fields in a year.

3.3.2.2.2. Modern and Traditional Varieties

In three of the villages, which are located in the hillside and mountain, the cultivation of modern varieties goes along with traditional varieties. Wheat is the main crop in these villages, along with barley, rye, corn and chickpea. Olive orchards are also a source of sustaining livelihood. These farmers prefer to plant the traditional variety in marginal areas where the expectation of yield is minimal due to the characteristics of the soil, and they would plant the modern variety in better parts of their field. These farmers cultivate the traditional variety for their own consumption needs. In good years, the farmers who plant both varieties sell part of their produce from the modern variety if

the yield is high enough to earn some cash money. However, one of the important mechanisms for earning money is that some members of the family go to the nearby towns to work, or even if they have their own land, they work as daily laborers (called tayfa) in fields of wealthy farmers in other villages whose fields are in the valley.[46]

The cultivation of the traditional variety is explained in terms of the convenience of the particular variety with regard to the soil in their field. Also, the straw of the traditional variety is used as animal feed, which was underlined as an important cause for planting it, as the traditional variety is longer than the modern variety. Yet, for example, in one of the villages, the farmers indicated that while animal husbandry used to be very important, it is now sharply declining. In the words of one farmer as to why he cultivates the traditional variety: "Whatever the field wants, I have to plant that. The local wheat is what my field wants". The other reason that farmers indicate for planting the traditional variety is the quality of its flour which is important for the taste of bread, as well as bulgur, and keşkek, which are particularly consumed in weddings and special days. The elderly farmers noted that in the past, they used to plant four or five different traditional varieties, and taste of the bread made from the mixture of these varieties was very good. Yet, many of these varieties are no longer available.

Also, elderly farmers who noted that they cultivate only the traditional variety underline the importance of their experience in farming, and how these varieties remained from their fathers, and grandfathers. For example, one such farmer said: "I have been planting this wheat (traditional variety) since I have known himself. For sixty years. This is what my father planted, and his grandfather planted". These farmers note

[46] It should be noted that it is mainly female members of the family who work as tayfa.

how they tried different local varieties along with the ones that they saw from their fathers, as well as wild relatives of wheat that they found nearby and mix them with other varieties. For example, the farmers in one of the villages, with great respect, told me to talk to a very old farmer who does not plant anymore, but who they said brought a wild variety to the village which he domesticated and shared with other farmers. This particular variety used to be widely cultivated in the village due its resistance to disease. Yet, at the same time, a younger farmer (30 years old) complained about his grandmother who insisted that he should plant the traditional variety for bulgur that she wishes to cook. He complained because he thought that the area used for the traditional variety could have been used for the modern variety, which gives higher yields, and that he could have sold it in the market.

In another instance, an interesting exchange occurred when I was in the local office of the MARA. An elderly farmer, from one of the mountain villages where I had conducted interviews, had gone there for registration in order to receive his direct income, while I was interviewing the local agricultural official. The official, complaining about the farmers because they do not plant the modern varieties that are introduced to them, suddenly turned to this farmer and asked what he was planting. The farmer replied that it was the traditional variety. The official showed this as his evidence, and started talking about why the farmer should stop planting the traditional variety and instead plant the modern variety. The answer of the farmer was as follows: "The real farmer plants the traditional variety. Soil is hard in my village, and if one wants to call himself a farmer, he needs to overcome its hardship. I do not plant the new

wheat, because it is not suitable to my soil. Every farmer has to know the soil in his field, and should know in which part of the field he should plant what. If my field had been elsewhere, I could maybe plant the new wheat. But what I have, I spent my life in this field, and (with great respect) whatever you (the official) say, I will not give up the wheat I have been planting. My son wants to plant the new wheat, and I do not know how long I will be able to work in the field, but I will not let him plant that until I die."

Table 3.2: Wheat production indicators in Balıkesir

Balıkesir	1981	1991	2001
Area sown (ha)	142,125	162,511	180,758
Production (tons)	373,260	483,954	486,984
Yield	2626	2993	2695

State Institute of Statistics, Agricultural Production.

Average growth rate	Area sown	Production	Yield
1981-1991	1.3 %	2.6 %	1.3%
1991-2001	1 %	0.06%	-1 %

3.3.3. Discussion

The farmers interviewed in both the Aegean region and the Western Transitional Zone are small-scale farmers in the Western part of Turkey.[47] The interviews conducted in both regions suggest important similarities in terms of the factors that affect the cultivation of modern and traditional varieties. The farmers have access to the modern high yielding varieties of seeds that are sold by the local office of the Turkish

[47] Agriculture in Turkey is mainly dominated by small farmers. Servet Mutlu notes that one of the factors that checked the tendencies towards concentration of land is the strength of self-employed peasant farmers vis-à-vis capitalist farming. Servet Mutlu, "Credit in Turkish Agriculture: Its Quantity, Distribution, and Triple Bias," METU Studies in Development 19, 3 (1992): 361-396.

Agricultural Institute, as well as private merchants. However, while some of the farmers prefer to use modern varieties of seeds, some of them still continue to cultivate the traditional varieties. In both regions, the farmers in villages located in the valley, partly having access to irrigation, and who are able to use machinery (i.e., tractors) in their land are using modern varieties. Some of the farmers in mountain villages, with little possibility of irrigation and not easily able to use machinery because of the nature of the land, continue to use traditional varieties.

The main reasons expressed for using the traditional variety is its adaptation to the environment, and its quality, particularly its baking quality and the taste of its bread. The farmers who cultivate both traditional and modern varieties also perceive the traditional variety as an insurance against possible losses from the modern variety. However, even in these villages, the cultivation of landraces is decreasing because the farmers are experimenting with the modern varieties. The main reason for cultivating the modern variety is its yield, which is higher than the landraces. The farmers have pointed out that even a marginal increase in yield is important.

There is an ongoing exchange of seeds at the community level, mainly with close neighbors and relatives who would have the good seed from previous years. For example, when asked about exchange of seeds, one farmer in a village from Eskişehir said: "I exchange seeds with anyone from the village. There is no 'I will not give my seed to you, or you would not give your seed to me'. Here, everybody knows one another, and it is your duty to provide seed if your neighbor needs it, and you have it". Another farmer from another village: "My neighbor comes to me asks for 1 kile (32 kilograms) of seed. Whatever he wants, I will give it. We all belong to this village. Next

time I will need something, and I know that he will give what I need. If I do not share what I have with my neighbors, they will look to me out of the corner of their eyes".[48] A farmer from Balıkesir "This wheat (summer wheat-traditional variety) I have from my father, it is an "ancestor seed". I collect and mix the better grain, and reserve them for sowing next year. My neighbor comes to me and he does not have enough or good grain then I give him. He will reciprocate. Next year he will give me his good grain, if I need it". The interviews do not reveal institutionalized channels for the exchange of seeds, such as seed fairs, it takes place informally between neighbors.

The farmers who cultivated traditional varieties noted that usually the younger members of the family were more inclined towards modern varieties as the yields were higher. This parallels the assumption by Meng et al. that age and education level of the farmer may affect the decision to cultivate modern or traditional varieties, where a farmer with a 'modern outlook' may be less inclined to cultivate landraces due to market influences, whereas an older farmer may be less likely to be concerned about market considerations.[49]

The existence of seed exchange among members of the community, and the preference for traditional varieties for reasons of taste point to the cultural and social factors that are at place in the cultivation of landraces. Also, the elder members of a community, who possess the most knowledge of the traditional variety, and in some

---

[48] This is a direct translation from Turkish, perhaps it could also be translated "with squint eye, or evil eye".

[49] Erika CH Meng,, J. Edward Taylor, and Stephen B. Brush, "Implications for the conservation of wheat landraces in Turkey from a household model of variety choice," in Farmers, Gene Banks and Crop Breeding: Economic Analysis of Diversity in Wheat,

cases who introduced a variety to the village by experimenting through selection and combination of different wild and already existing domesticated traditional varieties are widely respected by the other members of the community. These farmers are often referred to as the "real farmers" in the villages. The exchange of seeds, taste and preferences with regard to the flour and cooking quality of the traditional variety, as well as sharing of the knowledge particularly by the elderly 'real farmers' point to those components of social capital that the networks approach would bring to the forefront in the continuation of landrace cultivation practices. However, the interviews also reveal that, for example, in terms of the transmission of taste and preferences to the younger generations, there is a problem regarding the cultivation of traditional varieties. This in fact points to the depreciation of this component of social capital. The young farmers prefer to cultivate the modern variety with higher yields, and the major priority is not the baking quality or taste but yield attributes of these varieties.

The farmers who continue to cultivate landraces use them for home consumption, and do not sell them in the market. In villages where there is an increasing use of the high yielding varieties of seeds with greater access to commercial markets, the cultivation of landraces is decreasing. Particularly in connection with yield concerns, some of the farmers who cultivate both varieties have started experimenting with the modern varieties in recent years. One interesting point underlined by the farmers I interviewed is that the price that the private purchasers in the town market give to the modern variety is higher than the price for the traditional variety, pointing to

---

Maize and Rice, Melinda Smale ed. (Dordrecht: Kluwer Academic Publishers, 1998), 134.

a product differentiation in the wheat market. This is also verified in the interviews I conducted with the local wheat merchants. The main reason that these merchants underline is the preference by the flour factories for certain varieties of wheat to be processed. For example, in Balıkesir, it was the improved variety Cumhuriyet that was most demanded. While this is not the case with the State Purchasing Organization (TMO), the farmers I interviewed sold their product not to the TMO, but to the private purchasers. One reason for selling their product to private purchasers is that the TMO does not make immediate payment to the farmers. Also, in some cases, the TMO offices are far away in the city where it is hard for the farmers to pay for the transportation costs to bring their wheat to the city.

Referring to another case study in Turkey on the impact of structural adjustment policies in rural areas, Aydin notes that particularly the young generation of farmers with higher education levels are more market oriented, and use the modern varieties provided by the state agricultural institutes such as Ziraat and do not cultivate the traditional varieties because of their low yield attributes.[50] At the same time, Meng et al. note that their findings in the Turkish case suggest that households characterized by older heads of household and those with fewer years of education are more likely to

[50] Zülküf Aydin, "Yapisal Uyum Politikalari ve Kirsal Alanda Beka Stratejilerinin Ozellestirilmesi," (Structural Adjustment Policies and Privatization of Rural Livelihoods), *Toplum ve Bilim* 88 (2001), 21.

select traditional varieties over modern varieties for cultivation.[51] The interviews I conducted also suggest a similar inclination.

As underlined in the previous chapter, there are three processes by which genetic erosion may occur. First, farmers may decide to convert to modern varieties rather than planting traditional varieties. Second, farmers may switch to other crops than wheat. Thirdly, farmers may abandon agriculture altogether and take non-agricultural occupations. The interviews with farmers in Eskişehir and Balıkesir reveal that mainly in connection with yield concerns, farmers have in recent years started to cultivate the modern varieties of wheat, some of which they are able to sell in the market. It is for the most part elderly farmers who still cultivate the traditional varieties, and quality and taste of these varieties, as well as their suitability to soil are the factors frequently cited by those farmers for the continuation of their cultivation. The farmers who recently (2-5 years) started cultivating the modern varieties have indicated that yield concerns have pushed them to try to cultivate the modern varieties, even when their field is not very fertile, and they are aware that they will not get the same results as they would have had their field been in the valley. The interviews do not reveal a conversion from wheat to other crops.

In terms of patterns of migration from the rural areas to the towns and cities, the farmers in both regions noted that while there was migration in the past, in the last years this has stopped because of the limitations in finding jobs in the cities with the

---

[51] Erika CH Meng,, J. Edward Taylor, and Stephen B. Brush, "Implications for the conservation of wheat landraces in Turkey from a household model of variety choice," in Farmers, Gene Banks and Crop Breeding: Economic Analysis of Diversity in Wheat, Maize and Rice, Melinda Smale ed. (Dordrecht: Kluwer Academic Publishers, 1998), 131.

economic crisis. The farmers noted the following reasons for migration: the difficulty of maintaining sustainable livelihoods in the village, search for better living conditions in the cities, education, poverty and lack of regular income in the village. In the words of one farmer in a mountain village from Eskişehir: "Migration started maybe 30 years ago. In the last two years, it stopped. If the young can find jobs in the city, they will go. Tell me why they should stay here if they can go to the city?" Another farmer said: "Between mid1980s and end of 1990s, there was a lot of migration. Not so much in the last two years. People migrate because they are poor, they can not make their living in the village." An elderly farmer: "There was a lot of migration. Especially the young have gone to the cities. This village became poor, especially the young became miserable." A younger farmer: "I am planning to go to the city if I can find a job. Because the city provides better livelihoods if you have a job, and the children can go to school, not only primary but also high school." All these point out that the perception (especially among the younger farmers) is that of the difficulties in sustaining rural livelihoods and the search for better living conditions in the cities, when the economic situation and employment opportunities get better.

In this context, based on the synergy approach to social capital, in the conservation of crop genetic diversity, public agencies can be extremely important in the provision of mechanisms that will ensure that cultivation of landraces will meet the needs of rural communities in Turkey. While the components of social capital based on networks view that I noted above, namely, the seed exchange practices, sharing of knowledge, and the taste and preferences can be important in the continuation of practices of cultivating traditional varieties, with pressures for increasing the yield, the

desire to sell the surplus produce in the market, and the orientations of the younger farmers toward modern varieties point to the necessity of designing policies which will help to sustain the cultivation of landraces. Also, while currently there is a halt in out-migration, the perception among the farmers of the limitations of the village in terms of sustaining livelihoods, and the prospects of non-agricultural occupations in the city is another factor that needs to be taken into account.

What is crucial is to provide the farmers the means to sustain their livelihoods while engaging in the production of landraces. For example, one way to support the cultivation of landraces can be the establishment of markets for traditional varieties with higher prices for them. The yield of landraces (as well as the price in the market, according to interviews) will be lower than modern varieties but the price differences can compensate the 'loss' perceived by young and educated farmers through cultivation of landraces. As Boyce underlines, the higher prices for traditional varieties would, on the one hand, increase economic returns to landraces in comparison to high yielding varieties, and on the other hand, this would symbolically affirm the value of landraces. This can be particularly useful insofar as farmers' preferences for the traditional variety are important, in addition to yield. The following section, after a discussion of coproduction strategies based on the synergy approach to social capital and how this could be linked to conservation of crop genetic diversity, proposes a number of policy suggestions in the context of Turkey, as the area devoted to traditional varieties is decreasing.[52]

---

[52] Stephen B. Brush, "*In situ* Conservation of Landraces in Centers of Crop Diversity," Crop Science, 35, (1995), 352.

3.3.4. Coproduction and Crop Genetic Diversity

In the conservation of crop genetic diversity, public agencies can be extremely important in the provision of mechanisms that will ensure that cultivation of landraces will meet the needs of rural communities. As noted in chapter 2, for a successful system of coproduction, the dimensions of complementarity between public agents and farmers, and embeddedness as reflected in the dense network of social relationships between local public officials and communities need to established at the local level. By recognizing the local farmers' knowledge and communal practices of seed exchange, public agencies can be instrumental in developing policies that will actively engage farmers groups in the process. Without an understanding of the effect of farm based decisions on genetic variation, national programs will lack the information needed to assist on farm management of traditional varieties.[53] In turn, farmers need support in order to make it worthwhile that they continue cultivating landraces, particularly under financial constraints. Thus, complementarity between public officals and farmers can be established at this point. Jarvis and Hodgkin argue that while addressing the objective of conserving processes that promote genetic diversity of crop resources, national programs should also ensure the improvement of living standards of the farmers.[54] Brush also notes that that policy options for conservation must address development

---

[53] Devra Jarvis and Toby Hodgkin, "Farmer decision making and genetic diversity: Linking multidisciplinary research to implementation on farm," ," in Genes in the Field: On-farm Conservation of Crop Diversity, Stephen B. Brush ed. (Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000), 262.

[54] Ibid, 264.

goals as well as conservation.[55] "*In situ* conservation can be promoted by eliminating detrimental policies of development programs, such as requiring farmers to plant improved crop varieties if they accept credit. This would return responsibility for agricultural decision making to the farmer."[56]

Another strategy would be to enhance the local markets for traditional crop varieties. Also, Brush suggests that noneconomic means, such as awards to farming communities that maintain diversity, for which regional agricultural fairs would be an ideal setting, can be instrumental in supporting farmers.[57] Breeding efforts that rely on local varieties, in which both public agricultural researchers and farmers participate, can also be crucial.[58] Such a strategy would be possible only by building linkages between crop breeding research programs and farm level crop development.[59] A top-down approach that imposes a particular technology to the farmers without the recognition of farmers practices such as seed exchange, farmers innovations and their shared knowledge can indeed have destructive effects on these practices that are significant for the conservation of crop genetic diversity. Thus, the recognition of these smaller local units by public officials is extremely important.

---

[55] Stephen B. Brush, "Farmers Rights and Genetic Conservation in Traditional Farming Systems," World Development 20, 11 (1992), 1627.

[56] Ibid.

[57] Ibid.

[58] Benjamin S. Orlove and Stephen B. Brush, "Anthropology and the Conservation of Biodiversity," Annual Review of Anthropology, 25, 1 (1996): 329-52.

[59] Walter de Boef, Kojo Amanor, Kare Wellard, with Anthony Bebbington, Cultivating Knowledge: Genetic Diversity, farmer experimentation and crop research (London: Intermediate Technology Publications, 1993).

These smaller units at the community level will also be instrumental in the adaptation of generally designed public policies to the local circumstances. Thrupp notes that many experiences have revealed how true participation of farmers in decisionmaking and the full incorporation of local farming practices in agricultural research has had beneficial outcomes.[60] However, for a successful coproduction by public officials and farmers, embeddedness, complemented with autonomy is crucial. For this, the presence of coherent, dependable public institutions, and a bureaucracy with strong internal norms against clientelism is necessary. Thus, in situations where local communities lack the capability to conserve crop genetic diversity through the cultivation of landraces, public policies that incorporate the farmers in the decisionmaking and implementation process can positively affect the capabilities of farmers to conserve crop genetic diversity. Yet, as the literature on social capital underscores, the issue is not merely providing individual incentives to the farmers, since the production of landraces, as revealed in the Turkish context, has a social component in it, with the exchange of seeds, shared knowledge about the traditional varieties, and shared preferences about taste and quality.

3.3.5. Policy Suggestions for the Conservation of Crop Genetic Diversity in Turkey

Currently, there are no public policies that are aimed at the continuation of the cultivation of landraces in Turkey. Turkey has recently completed a pilot project financed by the Global Environmental Facility (GEF) on *in situ* conservation of plant

---

[60] Lori Ann Thrupp, Cultivating Diversity: Agrobiodiversity and Food Security, (Washington D.C.: World Resources Institute, 1998), 50.

genetic resources, yet, this project was aimed at wild plants and wild relatives of crops, and not landraces produced by farmers. However, there is an increasing recognition of the necessity to design policies that will address the cultivation of landraces, as these are expressed in the National Plan for *In Situ* Conservation of Plant Genetic Diversity in Turkey, and by the Ministry of Agriculture and Rural Affairs (MARA).[61] The Aegean Agricultural Research Institute (AARI) of the MARA has started a project called "On–farm Conservation of *In Situ* Diversity", in order to support the cultivation of landraces by farmers in the designated areas in the Western Transitional Zone of Turkey.[62] These point to the possibility of establishing coproduction strategies in which cooperation between government officials and farmers can be vital to the continuation of cultivation of landraces.

For an effective coproduction strategy, it is crucial that the government officials recognize the ongoing practices among farmers such as the exchange of seeds, and the cultural value that farmers attach to the traditional varieties, which make up the components of social capital that are important in the continuation of practices that maintain traditional varieties. The agricultural researchers from the State Research Institutes such as AARI can provide information to the farmers on the significance of the cultivation of landraces for the conservation of crop genetic diversity. At the same time, these researchers will need the traditional local knowledge of the farmers about

---

[61] Zeki Kaya, Ekrem Kün, and Adil Güner, National Plan for In situ Conservation of Plant Genetic Diversity in Turkey (Ministry of Environment: Environment Protection General Directorate, 1998).

[62] Interview with Ayfer Tan, Aegean Agricultural Research Institute. The AARI in Izmir also hosts the National Seed Bank of Turkey, where samples of landraces are being stored.

the cultivation of landraces, as these farmers, over years, have developed a knowledge base of the characteristics of diverse crops, their seeds and qualities. This reveals the dimension of complementarity that Ostrom notes for a successful coproduction strategy.

One strategy that can establish the basis of cooperation between agricultural researchers and farmers is participatory plant breeding.[63] If the traditional varieties of seeds can be used as the basis of crop improvement programs with the participation of farmers who will use the results, this can provide incentives for farmers to continue the cultivation of landraces.[64] The farmers may be willing to continue the cultivation of landraces, but lack the capability to do so because of lack of material resources. In this instance, government officials can provide financial assistance to the farmers that will support them to continue planting traditional varieties.

In terms of the relations of the farmers with the local agricultural officials, the interviews with the farmers reveal that local officials come and give information about how to fight against pests or diseases, about the new varieties of seeds that the villagers can use in their field, or about the laboratory facilities available for examination of the type of the soil of their fields. Some of the farmers noted that these officials do not really examine their problems (i.e. these officials did not even look at their fields) but just give them information with no use since it is not suitable. However, the majority of

---

[63] Participatory plant breeding is defined as the formalized cooperation between farmers and plant breeders in such activities as identifying crop improvement needs and priorities, selecting and evaluating varieties. See Stephen B. Brush, "The issues of in situ conservation of crop genetic resources," in Genes in the Field: On-farm Conservation of Crop Diversity, Stephen B. Brush ed. (Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000), p.20

the farmers indicated that while they see the information given by the local officials as potentially useful, they do not have the means (mainly material capabilities) to implement them. This is similar to the responses of the local officials. For example, one official indicated that when the prices of inputs are too high, as it is currently, it is almost the equivalent of swearing to these farmers to tell them they should use this particular herbicide or pesticide, or fertilizer, when the farmer is trying so hard to make ends meet with minimum expenses.

However, the main orientation of the local agricultural officials is that the use of modern varieties for increasing the yields is crucial for increasing the efficiency of agriculture, which is in line with the central priority of the Ministry of Agriculture and Rural Affairs. The farmers who still cultivate the traditional varieties are essentially seen as backward, and resistant to change. The strategy of affirming the value of the traditional varieties through the establishment of market for them with higher prices or other policies such as prizes or awards could be complemented by rewarding the MARA officials who encourage the farmers to engage in practices that will conserve crop genetic diversity. One important point that should be underlined is that the cultivation of traditional varieties need not exclude the cultivation of modern varieties with higher yields, and both types of cultivation can coexist. It is particularly important for these officials to work hand in hand with the agricultural research institutes of the MARA which will be responsible for undertaking the projects for the *in situ* conservation of crop genetic diversity.

---

[64] Ibid.

Policies that will support farmers to cultivate traditional varieties include ecological subsidies, such as payments to farmers to reward their contribution to the conservation of crop genetic diversity.[65] Yet, a problem with subsidies is to ensure that these flow to the farmers who conserve crop genetic diversity by cultivating landraces and not others.[66] This necessitates an embedded and autonomous Weberian bureaucracy in the sense that Evans has discussed, which should prevent the possibility of clientelism. Another policy can be enhancing the local markets for the sale of traditional varieties of crops, or the creation of markets if they are not existing already. Awards to farming communities that maintain diversity is a noneconomic means to encourage farmers to continue cultivating landraces, for this the establishment of agricultural fairs can be useful. Thrupp notes the seed fairs in Mexico, where local farmers display their conserved varieties and are publicly recognized for their conservation activities.[67]

3.4. Conclusion

This chapter has examined the conservation of crop genetic diversity in the light of the literature on social capital. While there are a number of studies that look at the role of social capital in the community management of natural resources, surprisingly, crop genetic diversity has not been included in these studies. The focus of the chapter

---

[65] James K. Boyce suggests this for the Mexican maize farmers who grow traditional varieties. See James K. Boyce, "Ecological Distribution, Agricultural Trade Liberalization, and *In Situ* Genetic Diversity," Journal of Income Distribution 6, 2 (1996), 279.

[66] Ibid.

[67] Lori Ann Thrupp, Cultivating Diversity: Agrobiodiversity and Food Security, 56.

has been on the farmers' practices of cultivating traditional varieties of wheat in the Western region in Turkey.

The interviews with farmers in Eskişehir and Balıkesir provinces reveal that in the cultivation of traditional varieties, the suitability of the variety to the soil, its adaptation to the environment, the reliability of the variety even in worst conditions, and its quality and taste, are the major reasons for their continued cultivation. The farmers exchange these varieties with one another based on relations of trust and reciprocity, and particularly the elderly farmers, who are most adamant in cultivating these varieties, share their knowledge with one another about the traits of these varieties and the innovations that they have made. The taste and preferences for the bread and other products made out of these varieties are also significant in their continued cultivation. These varieties are mainly consumed at home, and not sold in the market. However, while the components of social capital based on networks view, the seed exchange practices, sharing of knowledge, and the taste and preferences can be important in the continuation of practices of cultivating traditional varieties, there are increasing pressures for raising yield either to have enough food to consume at home, but more importantly, to sell the surplus produce in the market in order to earn some extra cash. These factors have led farmers to experiment with the modern varieties in recent years. In addition, with reference to the transmission of taste and preferences to the younger generations, there is a problem regarding the cultivation of traditional varieties, a sign of erosion of this component of social capital. The young farmers prefer to cultivate the modern variety with higher yields, and the major priority is not the

baking quality or taste but yield attributes of these varieties and the desire to sell in the market.

In this context, an effective coproduction strategy (based on the synergy approach to social capital) which will bring together the farmers communities and government officials can be extremely important in the maintenance of the practice of cultivation of traditional varieties. Unless there are productive linkages between the public agencies and farmers communities and carefully designed policies that will support farmers to continue to plant traditional varieties, the conservation of crop genetic diversity seems unlikely. However, the effectiveness of these policies in the Turkish context will be dependent on the extent to which public officials (agricultural reseachers and local officials) will recognize the existing patterns of relationships in the communities, the value and importance of the landraces to the farmers who still cultivate them, and their knowledge about the agricultural processes of cultivating landraces, and most importantly, the provision of mechanisms for the farmers to continue their practices.

Yet, currently, the major objective of the local public officials is to increase the yields by persuading the farmers to cultivate the modern varieties. This is in accordance with the major priority of the MARA, to increase the efficiency and productivity in the major crop in Turkey, namely, wheat. In fact, the government will start a new project regarding providing incentives for wheat farmers to cultivate modern varieties of wheat by providing them certified seed. The 'certified seed support for farmers project' is expected to comprise 10 million decares, and a total of 200,000 tons of modern varieties of seed is going to be used. The project will use the direct income system's farmer

registration program, which is the major component of the IMF/WB directed agricultural restructuring, and identify those farmers who can act as models for other farmers and provide advise to them in using these new varieties. The aim of the project is described as increasing yield, as well as the quality of the wheat being produced. Wheat farmers who sell their produce directly to the merchants or in the grain stock market will receive a certified seed premium of about 50,000 Turkish liras per kg for the amount (about 1/10 or 1/12) of the wheat that they have sold. The seeds will be provided by the MARA's breeding institution, and the private seed companies who participate in the project. This internally funded project is part of the Turkish government's attempt to increase productivity in wheat production. At this point, the target is to reduce the practice of exchange of seeds among the farmers, which is seen as an obstacle in increasing efficiency.

One of the problems in this view, coupled with the orientation of local agricultural officials to see those farmers who still cultivate the traditional varieties as backward and resistant to change is the inability of the government to appreciate the long term implications of conservation of crop genetic diversity by these farmers, by providing a significant global public good. The interviews reveal that there is not an inevitable trade-off between the cultivation of traditional varieties and the modern varieties, as there are farmers are who cultivate both.

However, at the same time, as noted above, Turkey has recently completed a pilot project financed by the GEF on *in situ* conservation of plant genetic resources, which was aimed at wild plants and wild relatives of crops. Although landraces produced by farmers were not included in the project, there is an increasing recognition

of the necessity to design policies that will address the cultivation of landraces, as these are expressed in the National Plan for *In Situ* Conservation of Plant Genetic Diversity in Turkey, and by particularly the General Directorate for Agricultural Research (GDAR) in the Ministry of Agriculture and Rural Affairs. The Aegean Agricultural Research Institute (AARI) of the MARA has started a project called "On–farm Conservation of *In Situ* Diversity", in order to support the cultivation of landraces by farmers in the designated areas in the Western Transitional Zone of Turkey. I will argue that despite the limitations imposed by this exclusive focus on increasing efficiency and productivity, these developments point to the possibility of establishing what the synergy approach to social capital has proposed. The next chapter provides an in-depth analysis of the implementation of the biodiversity institution/regime and its overlap with the neoliberal economic institution/regime as fostered by the IMF and the World Bank in the Turkish context, and their implications for crop genetic diversity conservation.

CHAPTER 4

THE CONSERVATION OF AGRICULTURAL BIOLOGICAL DIVERSITY IN TURKEY: AN ANALYSIS OF THE LINKAGES BETWEEN INTERNATIONAL AND NATIONAL LEVELS

4.1. Introduction

This chapter analyzes the linkages between international institutions/regimes and policy making at the national level, with particular attention to *in situ* conservation of plant genetic diversity. The Convention on Biological Diversity (CBD), opened to signature at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio, obligates countries party to the Convention to conserve, sustainably use, and guarantee access to genetic resources, in return for a fair and equitable sharing of the benefits arising out of the utilization of these resources. Prior arrangements existed (and continue to exist) for the conservation of plant genetic resources under the auspices of the Food and Agriculture Organization (FAO) and the Consultative Group on International Agricultural Research (CGIAR) focusing mainly on *ex situ* conservation practices.[1] Yet, the CBD, designed as a framework convention, is the comprehensive agreement that encompasses the broad range of activities concerning conservation of biological diversity, with a particular emphasis on *in situ* conservation.[2]

A party to the CBD, Turkey is one of the centers of origin and diversity of plant species and crop plants. At the same time, Turkey has been in a process of agricultural

---

[1] *Ex situ* (off site) diversity is represented by collections in gene banks and botanical gardens.

[2] *In situ* (on site) diversity is represented by wild relatives of crop varieties existing in uncultivated areas as well as crop varieties planted in farmers' fields.

liberalization which started in the 1980s, yet accelerated with the February 2001 economic crisis, and has been implementing a reform program directed by the International Monetary Fund (IMF) and assisted by the World Bank (WB). The chapter will examine of the implementation of the CBD in Turkey, with particular emphasis on *in situ* conservation of plant genetic diversity, and look at the impact of IMF/WB directed policies regarding agricultural liberalization. Linkages among institutions involved in an issue area may contribute to compliance to international obligations.[3] Yet, interference by individual institutions/regimes with one another's operations may have a negative impact on each other's operations. In this context, the CBD, as an international regime/institution, may have a positive impact on the national capacity of Turkey to conserve genetic diversity at the domestic level, while the IMF/WB, through the push of agricultural liberalization, may have a negative impact on the national capacity of Turkey to implement policies regarding conservation of genetic diversity.

In this chapter, I will argue in line with constructivist approach that the CBD, as an international environmental institution/regime, played a crucial role in providing and expanding the space and institutionalized channels for scientific input to be incorporated into the domestic policy-making process for the conservation of biological diversity. The GEF 1 project was instrumental in building technical capacity for *in situ* conservation as a policy innovation. The project is hailed as a global model for *in situ* conservation of wild relatives of crops. The CBD, the GEF, and the FAO have reinforced each other in terms of the ability of the Turkish state to formulate policies for

---

[3] Peter M. Haas, "Choosing to Comply? Theorizing from International Relations and Comparative Politics," in Commitment and Compliance: The Role of Non-binding Norms in the International Legal System, Dinah Shelton ed. (Oxford; New York: Oxford University Press, 2000).

the conservation of genetic resources. The NGOs also played an important role in initially bringing together scientists and public officials, and later collaborating with scientists and augmenting local participation in conservation efforts.

In this context, I will argue that the empowerment mechanism, mainly, the strengthening of non-governmental domestic actors, which is linked to the constructivist approach, is extremely important in the local participation for the conservation of crop genetic resources, given the recognition of the importance of the NGOs in local conservation efforts, which was crystallized during the GEF 1 project implementation. This process of local participation is inextricably linked to the social capital, both efforts particularly to build social capital from "outside in" (or, the synergy approach), as well as the networks view which emphasizes the sources of social capital (i.e. practices of reciprocity) within the farmers' communities at the local level in Turkey for the conservation of traditional varieties.

Yet, as I noted in chapter 3, the possibility of formulating and implementing policies in accordance with the synergy approach to social capital is dependent on the extent to which public officials (agricultural researchers and local officials) recognize the existing patterns of relationships in the communities, the value and importance of the traditional varieties to the farmers who still cultivate them, and their knowledge about the agricultural processes of cultivating these traditional varieties. Most importantly, however, the provision of mechanisms for the farmers to continue their practices. This process necessitates the diffusion of the idea of the significance of *in situ* conservation of traditional varieties among the central agricultural bureaucracies, and from them to the local agricultural officials. However, in the Turkish context, this

process is significantly circumscribed by the agricultural priorities set by the government. These priorities in turn are determined by the agricultural liberalization process directed by the IMF and supervised by the World Bank. The chapter will analyze how this is reflected at the domestic policy making level, and at the local level agricultural practices of the farmers.

In the context of policies for agricultural liberalization in the case of Turkey, a major objective is to change the nature of the involvement of the state in the sector, mainly, downsizing it, which will reduce the capacity of the state to support crop genetic diversity. The aim of the reform program currently in place is to increase productivity in response to real comparative advantage, and the reforms are expected to promote allocative efficiency. As such, I will argue that, the priorities of the CBD, as reflected in *in situ* conservation of crop genetic resources, is conceptually nested below the broader priority of market oriented growth, which is expected to increase efficiency and productivity in the agricultural sector.

I had noted earlier the three processes that genetic erosion may occur, namely, replacement of traditional varieties of crops of diversity by modern varieties, with different crops altogether, or by the exodus of the farmers to non-farm employment. The downsizing of the state, hence reducing its capacity to conserve crop genetic resources can contribute to these three processes. As this dissertation's focus is on wheat production in Turkey, if the agricultural restructuring directed by the IMF and assisted by the World Bank concentrates state support on industrial crops and withdraw support from traditional crops such as wheat, then this would give farmers incentives to convert to supported crops and shift away from wheat. Also, agricultural price squeeze,

falling real output prices and rising real input prices, and rising net agricultural imports can have the impact of pressuring wheat farmers to abandon farming and search for non-agricultural occupations.

After an elaboration of the international efforts at the conservation of biological diversity and plant genetic resources, the chapter will examine the factors at play in the conservation of plant genetic diversity in Turkey. It will propose some notes about the nature of policies adopted at the national level by looking at the interaction between international conventions/agreements and national policy making, as well as the limitations of and possibilities offered by domestic structures.

4.2. Biological Diversity and the Conservation of Plant Genetic Diversity: The International Undertaking (IU)

Until the early 1980s, national, as well as international conservation efforts focused on wild species of plants and animals.[4] Rosendal points out that an important shift came when questions of access to, and control over plant genetic resources were raised in the United Nations Food and Agriculture Organization (FAO) by governments of the developing world. In this context, one important international mechanism was the International Undertaking on Plant Genetic Resources (IU) adopted by the FAO in 1983. Legally unbinding, one controversial statement of the IU was the definition of all plant genetic resources as the 'heritage of mankind', including special genetic stocks

[4] Kristin Rosendal, "The Convention on Biological Diversity and TRIPs: Different Approaches to Property Rights to Genetic Resources—Cause for Worry?" Project No. D 5 (Final Draft) (The Fridtjof Nansen Institute, 2003).

and breeders' lines.[5] Thus, the IU called for free access to genetic resources. While the developing countries underlined that private breeders should provide them free access to elite breeding varieties in return for raw germplasm that is provided by themselves, developed countries argued that such an agreement would not recognize the propriety nature of breeding material and finished varieties and thus undermine incentives for investment by the private sector in varietal improvements.[6] The IU underwent several changes throughout the period, consequently culminating in the adoption of the International Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA) on 3 November 2001. The International Treaty (IT) establishes a Multilateral System for access and benefit sharing, which applies to 64 major crops and forages.[7] One of the major reasons for the revision of the International Undertaking was to harmonize its provisions on access with the CBD principles.[8] Rosendal also notes that the CBD and the FAO have been working out a compatible division of labour in regulating benefit-

---

[5] Michael Flitner, "Biodiversity: of Local Commons and Global Commodities," in Privatizing Nature: Political Strategies for the Global Commons, Michael Goldman eds. (New Brunswick, N.J.: Rutgers University Press, 1998), 144-166.

[6] George B. Frisvold and Peter T. Condon, "The Convention on Biological Diversity and Agriculture: Implications and Unresolved Debates," World Development 26, 4 (1998): 551-570.

[7] Material Transfer Agreement sets the conditions for access and benefit sharing. The Treaty also gives governments the responsibility for implementing farmers' rights, which include the protection of traditional knowledge, and the right to participate equitably in benefit sharing and in national decision making about plant genetic resources. See Desiree McGraw, "The CBD: Key Characteristics and Implications for Implementation," RECIEL 11, 1 (2002): 17-28. McGraw notes that this was a dilution of the original G77 proposal for the farmers' rights.

[8] As such, the Treaty's objectives are set out as the conservation and sustainable use of plant genetic resources for food and agriculture, and the fair and equitable sharing of the benefits derived from their use, in harmony with the CBD, for sustainable agriculture and food security.

sharing and access to genetic resources.[9] The next section provides a discussion of the CBD, its importance with regard to conservation of genetic resources, and it elaborates the interplay between the CBD and the requirements of the neoliberal economic institution/regime as embodied by the IMF and the World Bank.

4.3. The Convention on Biological Diversity

The Convention on Biological Diversity (CBD) arose out of the growing recognition that the world community should take concerted action to ensure the conservation of species and ecosystems.[10] Hendricks notes that the contemplation for a worldwide agreement on biodiversity stemmed from a will to come up with an 'umbrella convention' which would coordinate or consolidate the multitude of global and regional treaties in the field under a single administrative structure.[11] With reference to plant genetic resources, the CBD emphasizes the significance of *in situ*

---

[9] Kristin Rosendal, "The Convention on Biological Diversity and TRIPs: Different Approaches to Property Rights to Genetic Resources—Cause for Worry?"

[10] Cyril De Klemm, "Biological Diversity Conservation and the Law: Legal Mechanisms for conserving species and ecosystems" IUCN Environmental Policy and Law Paper, No. 29, 1993.

[11] Hendricks, "Transformative Possibilities: Reinventing the Convention on Biological Diversity," in Protection of Global Biodiversity: Converging Strategies, Lakshman Guruswamy and Jeffrey A. McNeely eds. (Durham and London: Duke University Press). Some of these Conventions include the Ramsar Convention, (Convention on wetlands of international importance) (1971); World Heritage Convention, (1972); Bonn Convention, (Convention on conservation of migratory species of wild animals) (1979); CITES (Convention on International Trade in Endangered Species of Fauna and Flora) (1973), among others.

conservation[12], and establishes rules on the access to genetic resources and on benefit-sharing. The CBD, by explicitly recognizing the national sovereignty of states over the natural resources in their territory, also reflects a change from the normative principle of common heritage of mankind. Yet, although states have sovereign rights over their biological resources, as reaffirmed by the preamble of the Convention, they at the same time have the responsibility for conserving their biodiversity and use their biological resources in a sustainable manner. Article 15.1 of the CBD states that the authority to determine access to genetic resources rests with the national governments, and is subject to national legislation, and article 15.5 underlines that access to genetic resources shall be subject to prior informed consent of the contracting party providing the resource, unless that party decides otherwise. Consequently, the collection of genetic material will generally now be subject to a permit, and the conditions of access will have to be mutually agreed.[13] Article 16 of the Convention states the obligation to provide and/or facilitate access to and transfer of technologies that are either relevant to the conservation and use of biological diversity or make use of genetic resources. It should be underlined that access to and transfer of technology to developing countries should be facilitated under mutually agreed terms, and in the case of technology subject to patents and other intellectual property rights, such access and transfer should be

---

[12] In the preamble of the CBD, it is stated that "...the fundamental requirement for the conservation of biological diversity is the *in situ* conservation of ecosystems and natural habitats..." and "...*ex situ* measures, preferably in the country of origin, also have an important role to play". In the Articles 8 and 9 of the CBD, on *in situ* and *ex situ* conservation respectively, the emphasis on *in situ* conservation, and the idea that *ex situ* conservation is predominantly a complementary measure to *in situ* conservation is laid out clearly.

[13] Cyril De Klemm, "Biological Diversity Conservation and the Law: Legal Mechanisms for conserving species and ecosystems," 19-20.

consistent with the adequate and effective protection of property rights (article 16.2). At the same time, article 16.5 recognizes the influence of patents and other intellectual property rights on the implementation of the Convention, thus, parties shall cooperate in this regard subject to national legislation and international law in order to ensure that such rights are supportive of and do not run counter to the objectives of the Convention.

Thus, one of the objectives of the CBD is fair and equitable sharing of the benefits arising out of the use of genetic resources, including access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over these resources and to technologies, and funding (article 1). This normative orientation toward equitable sharing, Rosendal argues, is based on the understanding that costs and benefits of biodiversity have been asymmetrically distributed, and there is a need for this situation to be remedied for biodiversity loss to be prevented.[14] Thus, the concerns for equitable sharing and conservation constitute the core norms and principles engendered by the CBD. Indeed, the idea that was expressed by the developing countries with regard to biodiversity and property rights was that genetic resources from wild and domesticated ecosystems of the South, as well as the traditional knowledge of indigenous peoples living in these ecosystems were being transferred to the North based on the principle of 'common heritage of mankind' whereas "the commercially valuable substances and technology derived from these resources by developed countries, as well

---

[14] Kristin Rosendal, "Impacts of Overlapping International Regimes: The Case of Biodiversity," Global Governance 7 (2001): 95-117.

as the environmental technology developed by these same countries are prohibitively expensive because of the intellectual property afforded them".[15]

During the negotiations, with regard to technology transfers, based on the idea that the effective protection of private property rights is a pillar of a liberal economic order, the developed countries argued that intellectual property protection promotes conservation by enhancing the commercial value of genetic resources contained in biodiversity. From the US perspective, intellectual property rights play a positive role in the conservation of biodiversity as well as its sustainable use, and without adequate protection of intellectual property rights, research, new product development and foreign investment will be repressed.[16] On the other hand, developing countries opposed this view based on the idea that intellectual property rights actually "hinder their economic development because of the costs imposed."[17]

Rosendal underlines that there has been an overlap between the CBD and the trade related aspects of intellectual property rights (TRIPs) under the World Trade

---

[15] Charles McManis, "The Interface between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology", Washington University Law Quarterly 76, 1 (1998): 268. For example, during the negotiations for the CBD, India called for technology transfer to developing countries on a 'preferential and non-commercial basis' and reward of informal innovation by local people. Other developing countries made similar demands, with Brazil stressing the obligation for developed countries to transfer technologies that support biodiversity conservation and sustainable use, and Kenya arguing that the recognition and compensation of indigenous knowledge and technologies should be a fundamental principle. See Mukund Govind Rajan, Global Environmental Politics: India and the North-South Politics of Environmental Issues (Delhi; New York: Oxford University Press, 1997).

[16] Melinda Chandler, "The Biodiversity Convention: Selected Issues of Interest to the International Lawyer" Colorado Journal of International Law and Policy 4 (1993): 141-175.

[17] Karen W. Baer, "A Theory of Intellectual Property and Biodiversity Treaty" Syracuse Journal of International Law and Comm., 21 (1995), p.275.

Organization (WTO). Particularly, the divergence of the norms of the two regimes crystallized as the TRIPs "seeks to enhance trade liberalization by strengthening and harmonizing intellectual property rights (IPR) systems, such as patent legislation, in all technological fields worldwide".[18] Thus, as against CBD norms, the TRIPs aim to promote the privatization of genetic resources through individual rights.[19] While the national sovereign rights over genetic resources framed in the CBD were used as a compromise for accepting, on certain conditions, the expanding use of patents, particularly in biotechnology, the interaction between the CBD and the TRIPs is arguably leading to disruptive effects with regard to conservation of, access to, and equitable sharing of benefits from genetic resources.[20] The position of the developing countries with regard to intellectual property protection is that the current system is weighted in favor of technological innovation that has come to characterize the industrialized world, and "against farmers in developing countries who have contributed for generations to the preservation of species and to the improvement of them through an incremental, informal and highly collective form of agricultural innovation that has contributed to genetic diversity."[21] The idea is that traditional agricultural innovation do

---

[18] Kristin Rosendal, "Impacts of Overlapping International Regimes: The Case of Biodiversity," Global Governance 7 (2001), 103.

[19] Ibid.

[20] Kristin Rosendal, "The Convention on Biological Diversity and TRIPs: Different Approaches to Property Rights to Genetic Resources—Cause for Worry?"

[21] Charles McManis, "The Interface between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology", Washington University Law Quarterly 76, 1 (1998), 268.

not conform the criteria for intellectual property protection, such as novelty, uniformity, stability, and inventiveness.

Looking at different stages of environmental governance, I noted in chapter 2 that different approaches in International Relations literature offer various propositions. For example, the realist approach would predict that all stages of policy formation are the same, pointing out the significance of the existence of a hegemon at the stage of regime formation, as well as implementation. In terms of issue framing, realism would predict that it is highly unlikely for developing country interests to dominate the agreement, unless they coincide with the interests of the dominant actors. However, the discussion above reveals that this was hardly the case. As Rosendal notes, the normative orientation of the CBD with the recognition of the sovereign rights of states over the genetic resources that are within their territory, as well as the emphasis on equitable sharing of the benefits arising out of the utilization of these resources was the breakthrough of developing countries, reflecting the position of gene-rich developing countries of the South, as opposed to developed countries, including the United States. This was the major reason why the United States did not ratify the Convention, even though it was one of the pioneers initially for the formulation of a convention on biological diversity. Neoliberal Institutionalism, on the other hand, would propose that at the regime formation stage, cooperation is possible if there are mechanisms that will align different actor's interests. At this stage, one could argue that the incentives that would be provided, such as the financial mechanism GEF, would contribute to cooperation. However, David Fairman notes that there were significant North-South

divisions in the operation and structure of the GEF[22], and there was a strong resistance from the developing countries to make the GEF the permanent financial mechanism of the CBD. Yet, the existence of GEF as an incentive mechanism can be argued to have a different impact at the implementation stage, an issue that I will return later. According to the constructivist approach, at the regime formation stage, consensual knowledge and social learning will give rise to commonly accepted international norms and ideas, and in terms of issue framing, the direction of this process will depend on who provides intellectual leadership. Rosendal argues that the central feature on which learning processes and development of common norms hinge on the negotiations for the CBD is the concept of fair and equitable sharing of the benefits arising from utilization of genetic resources, and the main proponents of this concept were the developing countries of the South, and some NGOs.

In terms of the overlap between institutions/regimes, I will argue that, in addition to TRIPs, it is also crucial to look at the interplay between the international financial institutions (IFIs) such as the International Monetary Fund (IMF) and the World Bank (WB) and the CBD, especially in the context of developing countries, where they push these states for reforms in various economic sectors towards liberalization. With particular relevance to the CBD may be the restructuring of the agricultural sector by the elimination of various mechanisms deployed by states to support the rural sector. This push for reform may take different forms, based on the particular agricultural structure and the nature of the existing policies of each state.

---

[22] David Fairman, "The Global Environmental Facility: Haunted by the Shadow of the Future," in Institutions for Environmental Aid: Pitfalls and Promise, Robert O. Keohane and Marc A. Levy eds. (Cambridge, MA.: The MIT Press, 1996), 55-87.

The World Bank in 1950s and 1960s was primarily involved in providing financing for discrete projects, mostly infrastructure.[23] In a process of reformulating its mandate, the Bank started making structural adjustment loans, which are conditioned on a client state's willingness to undertake broad, market-oriented economic reforms, and this practice accelerated during the 1980s, as the Bank encouraged states to pursue policies designed to yield macroeconomic stability and private sector involvement in development.[24] The Bank provides financing, which is focused on structural lending and small market oriented projects. Under current policies, both the IMF and the World Bank have aimed to impress upon developing states the importance of the markets and the deleterious effects of state regulation or involvement in the economy.

In terms of the agricultural sector, the aim of the reforms is mainly expressed as market oriented production and less government intervention in the agricultural sectors with the aim to prevent the inefficiency and huge public deficits caused by this intervention. While this objective per se does not provide a ground for incompatibility between the CBD aims, it is important to look at the possible impact of these regulations laid out by the IMF/WB in different contexts. On the one hand, one could argue that the implementation of these objectives may lead to more efficient production and less environmentally degrading practices by the farmers. On the other hand, however, there may be too much pressure on the farmers for efficiency and market oriented production which may lead to unsustainable use of the resources. This could

---

[23] Jonathan C. Carlson, "Strengthening the Property Rights Regime for Plant Genetic Resources: The Role of the World Bank," Transnational Law and Contemporary Problems 6, 1 (1996): 91-122.

[24] Ibid.

involve, in the context of crop genetic diversity, the abandonment of traditional varieties in favor of modern varieties, or put pressure on the livelihoods of the farmers which may cause their abandonment of farming altogether.

Before focusing on the impacts at the local level, however, I will argue that it is necessary to analyze the impact of the agricultural liberalization process on the capacity of national governments to carry out certain environmental obligations, with particular reference to the CBD. For example, one possible contradiction, though not *a priori*, but could be reflected in the implementation stage, may be with reference to the article 6b of the CBD, foreseeing the integration of conservation and sustainable use of biological diversity into sectoral and cross-sectoral plans, programmes and policies. The governments under IMF/WB restructuring may emphasize the priority of agricultural efficiency in production and thus it may become difficult and costly to integrate the conservation and sustainable use of biological diversity into the agricultural sector.

The next section will provide an analysis of plant genetic diversity conservation in Turkey. In terms of the measures that the countries should undertake for the conservation and sustainable use of biological diversity, article 6 of the CBD states that countries party to the Convention shall adopt national strategies, plans or programmes for the conservation and sustainable use of biological diversity (article 6a), and integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies (article 6b). Also, the parties must identify the components of biodiversity important for its conservation and sustainable use, monitor these, and identify processes and categories of activities which have or are likely to have significant adverse impacts on biodiversity (article 7). Parties are required

to submit reports to the Conference of the Parties (COPs) on the measures taken to implement the Convention and on their effectiveness in meeting its objectives (article 26).

In examining the implementation of the CBD, I will use six indicators proposed by Rosendal, which are: follow up in the form of conservation plans and programmes; symbolic language (consistent use of the same terms); policy instruments aimed at conservation activities; related institutional changes in the government agencies; legislation controlling access to genetic resources; and local participation (Rosendal, 2000: 241-242). After that, the following section (4.5.) will look at the agricultural liberalization process in Turkey. The indicators that I will use for IMF/WB impact include agricultural policy priorities set up in the documents and instruments used, data on agricultural subsidies, and data on wheat production and imports and exports.

4.4. Plant Genetic Diversity in Turkey

4.4.1. Early Conservation Measures

Turkey started nature conservation activities at the end of 1950s, when Yozgat Camlığı was identified as the first national park.[25] In 1987, the number of national parks were 17, and the total area they comprised were 267 thousand hectares. Kışlalıoğlu and Berkes note that the priority of these national parks was to preserve nature, as well as provide recreation sites.[26] Today, the total number has reached 33, and the area they

[25] The Ministry of Forestry is responsible for managing national parks.

[26] Mine Kışlalıoğlu and Fikret Berkes, *Ekoloji ve Cevre Bilimleri* (Ecology and Environmental Sciences) (Remzi Kitabevi, 1994).

comprise 686 thousand hectares. These national parks are referred by government officials as the first examples of *in situ* conservation activities. However, since the selection of criteria of where to identify an area as a national park depended on both the preservation of nature as well as recreation, it was more the forestry areas and archeological sites with historical significance that were chosen.[27] While national parks may be significant in terms of conserving species and habitat diversity, they are not by themselves adequate measures. The management of these national parks was not necessarily effective in the sense that no active measures were taken in order to protect the species in these areas. A related problem has been the insufficient number of technical personnel and equipment necessary for an effective conservation strategy. In addition to these national parks, there are five biogenetic reserves and two biosphere reserves. Also, starting in 1988, Special Environmentally Protected Areas were created in order to extend the nature conservation areas.

National plant genetic resources conservation activities go back to the 1960s, when an agreement was signed between the Turkish government and the United Nations Special Fund (UNSF) and FAO which led to the establishment of Crop Research and Introduction

---

[27] For example, Ekim notes that the number of national parks in steppe ecosystems which host endemic plants are low. Tuna Ekim, "Plants" in Turkey's Biological Riches, Aykut Kence ed (TCSV, 1987).

Table 4.1. Type, Number and size of conservation areas in Turkey

Conservation Types	Number	Total Area (ha)
National parks	33	686,631
Nature conservation areas	35	83,024
Nature parks	17	69,505
National monuments	101	503
Seed stands	366	45,621
Gene conservation forests	188	25,633
Wildlife conservation areas	109	1,800,000
Specially protected regions	12	418,000
Protection forests	61	N/a
State farms	38	381,162

Source: Ministry of Forestry and Environment; Yeşil Atlas (Green Atlas), November 2003

Center (CRIC), now the Aegean Agricultural Research Institute (AARI) in Izmir.[28] AARI, part of the Ministry of Agriculture and Rural Affairs (MARA) of Turkey, is the central institute that coordinates mainly *ex situ* conservation of plant genetic diversity. As noted previously, the CBD has emphasized *in situ* conservation of plant genetic diversity. This institute is responsible from the ongoing National Plant Genetic

[28] Ayfer Tan, "Current Status of Plant Genetic Resources Conservation in Turkey," in Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity, N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. (Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998).

Resources Research Project which started in 1964. The aim of the project is to identify, collect, preserve, and make use of the genetic resources of the country. Fırat and Tan note that collection is done by sampling variation and determining the interspecific, agroecological and phytogeographical distribution of plant species found in Turkey and the patterns of variation are related to ongoing genetic erosion.[29] The institute is also conducting research on *in vitro* conservation and rapid propagation of certain materials. While extensive evaluation activities started only recently, genetic resources material of several crop species have been utilized by breeding programs in Turkey.[30] AARI works with other national agricultural research institutes (NARs) located in different parts of the country.

Thus, despite the existence of various measures by the Turkish government to conserve natural resources in the 1960s and 1970s, the idea of conservation of biological diversity with all the three levels that were discussed previously was not a part of the governmental agenda until the end of 1980s. The conservation activities that were in place were not a result of a comprehensive understanding of the importance of biological diversity at all levels. A holistic approach to active conservation had not been integrated into the planning of natural resource conservation. The *in situ* approach adopted by the Ministry of Forestry did not reflect such an approach, and the activities of AARI of the Ministry of Agriculture, responsible from the conservation of plant genetic resources, mainly focused on *ex situ* conservation.

---

[29] Ertug Fırat and Ayfer Tan, "Turkey Maintains Pivotal Role in Global Genetic Resources," Diversity 11, 1&2, (1995): 61-63.

[30] Ibid.

4.4.2. Enter Biological Diversity

In 1987, a nongovernmental organization (NGO) located in Ankara, the Environmental Problems Foundation of Turkey (TCSV) undertook a project aiming to publicize the issue of biological diversity in Turkey. As part of the project, the Foundation published two books on biological diversity, one with the title "*Turkey's Biological Riches*" and the other one, Biological Diversity. The first book was edited by a biologist from the Middle Eastern Technical University (METU), Prof. Aykut Kence, with the aim to bring together scientists from different disciplines to define biological diversity, provide an inventory of the biological resources of Turkey, and identify the problems associated with the conservation of these resources. The second book was written by Mine Kışlalıoğlu Berkes and Fikret Berkes, two Turkish ecologists located in Canada, with a discussion of the issue of biological diversity in the world context and its implications for various sectors, with an emphasis on examples from Turkey. These two books provided a comprehensive introduction to the issue of biological diversity in Turkey and the importance of conservation of biological resources.

The Foundation later organized a conference on Biological Riches and Development, bringing together Turkish scientists from various disciplines and policy makers to discuss the linkages between the conservation of biological diversity and economic development in Turkey, the existing policies and their limitations, and what should be done to protect the biological resources of Turkey.[31] The participants in the conference frequently underlined the significance of scientific collaboration among

[31] The proceedings of this conference were also published as a book by TCSV in 1988.

researchers, bringing together basic and applied sciences; agricultural engineers, forestry engineers and biologists. Also, the participants indicated that the scientists had a particular responsibility in bringing the importance of conserving biodiversity to the attention of Turkish parliamentarians and policy makers. The need for the establishment of an institution in Turkey to coordinate scientific research and the creation of national policy priorities for the conservation of biological diversity, with particular emphasis on genetic diversity, but also linking genetic diversity to species and ecosystem levels was another policy suggestion that came out of the conference.

Prof. Kence has indicated that following these publications, the State Planning Organization (SPO), in 1989, proposed a project on biological diversity to be undertaken by the Turkish Scientific and Technological Research Foundation (TUBITAK) under his leadership.[32] In addition, a group of Turkish botanists published a red book of Turkish flora (Tuna Ekim et al.), which took as its basis the 9 volume Flora of Turkey and East Aegean Islands edited by A. Davis.[33] This book was revised and updated in 2000 according to the data results of the Turkish Endemic Plants Project, which was undertaken with the coordination of SPO and support of TUBITAK between 1992-97. Thus, scientific research with the aim to provide a comprehensive inventory of

---

[32] Interview with Aykut Kence. TUBITAK is the largest state scientific research organization in Turkey.

[33] Tuna Ekim, "Biological Diversity," Proceedings of the Symposium on the History of Environment and Environmental Protection in Turkey, organized by Turkish Economic and Social History Foundation, 2000. The book edited by Davis was completed in the years between 1965-85, also comprising the work of Turkish botanists that were conducted since 1960s. In 1988, the first addition to the book was published. The second addition, which includes the work done after 1988 was prepared by Turkish botanists with support from TUBITAK.

the biological resources of the country, and bring together the existing academic work gained momentum. However, despite these developments, it was not until the period that Turkey signed the CBD in 1992, and ratified in 1997 that there were institutionalized channels by which scientists could provide direct input to the formulation of policies regarding the conservation of biological diversity in Turkey. The preparations of the government in order to fulfill the requirements of the CBD regulation provided the space for the Turkish scientists to take active part in the process of policy planning and making.

The scientists who act as advisers to government agencies responsible for the formulation of government policies in Turkey mainly include biologists, forestry engineers, botanists, agricultural engineers and biochemists. There are two major paths that scientists can participate in the process: first, by occupying official advisory positions in the discussions and the preparation of plans for the conservation of biological diversity in the related ministries and the State Planning Organization (SPO). Second, they may take the leadership of scientific projects that are being sponsored by state institutions. The scientists that I have interviewed underlined the significance of conserving the genetic diversity of plants mainly because of their characteristics that are crucial for global benefit, since these resources provide invaluable information, in the words of one scientist "the cornerstone of life", with global implications. The importance of conserving wild relatives of crop plants, forest resources, as well as the farmer selected varieties, landraces is emphasized. Only one out of the seven scientists I interviewed did not put emphasis on these views. The contribution of farmers is mainly viewed as the process that has maintained this diversity and is in constant evolution.

The scientists also point out the importance of *in situ* conservation of genetic resources, as well as *ex situ* conservation with proper conservation methods and new technologies, and the characterization of the material. There is a particular emphasis that priority has to be given to the plants which are under the threat of becoming extinct.

The scientists underline that the economic value of certain plants can be one motivation to benefit from the consequences of conservation, and in the long run be a part of the conservation strategy, however, it can not be the single criteria upon which conservation measures and targets are decided. The priority for conservation should not be based solely on the potential economic value of these resources. Thus, while the use of genetic resources and the economic benefits from their utilization is an important mechanism for the motivation to conserve them, there is strong emphasis on producing concrete scientific criteria for conservation. Yet, in terms of conservation priorities, there is a particular emphasis on wild plants and wild relatives of crops, and the diversity of domesticated crops in farmers fields come as the following conservation targets. One major reason for this heightened attention towards wild plants is explained by the increased threat that these varieties are under because of intensive illegal collection of these for commercial purposes, and the pressures stemming from increased unsustainable agricultural practices in a market oriented economy where there is a concentration on particular types of products. However, this stance does not reflect an overall rejection of the market, rather an emphasis on the negative impact that these have, and the necessity to take measures. Tuna Ekim underlines the pressure of human impact on local rare endemics, and according to the Red Data Book for Turkish Plants, approximately 400 endemic species grow near big cities or in sensitive places where

they are strongly threatened. Prof. Bakır notes that plowing up grasslands, overgrazing, excessive gathering of some ornamental, aromatic and medicinal plants of nature, accelerated erosion, the destructive land use during construction of highways, dams and mines, intensification of cultivation of arable lands, expansion of cultivation into marginal areas and the replacement of landraces by new varieties are the important threats for plant diversity.[34]

Prof. Aykut Kence notes that policy priorities for the conservation of biological diversity in Turkey include the development of databases for diversity, the identification of hot spots for species, and the establishment of a museum of natural history, which will include plant and animal species.[35] Prof. Tuna Ekim also emphasizes the importance of the establishment of a museum of natural history, as well as a national botanical garden.[36] He also points out that without the establishment of these institutions, it is not easy to have an effective biodiversity conservation policy.[37]

One policy suggestion that the scientists agree upon includes the construction of *in situ* management of genetic resource rich areas on a regional basis, yet part of an integrated comprehensive national policy. Prof. Kence points out the necessity for the

---

[34] O. Bakir, "Management systems for in situ conservation of plants," in Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity, N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. (Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998).

[35] Interview with Prof. Aykut Kence.

[36] Interview with Prof. Tuna Ekim.

[37] For example, Prof. Ekim noted that the establishment of these institutions would pave the way for the scientists who work as the directors of these institutions to participate in the international meetings regarding biodiversity, which would strengthen the position and the views expressed by Turkey.

establishment of an *in situ* conservation network encompassing Turkey. For example, according to Prof. Neşet Kılınçer, the national policy ought to be constructed based on a comprehensive understanding of the various interactions between different levels, ecosystem, species, and genetic diversity.[38] He notes that *in situ* conservation of farmers' varieties can be realized by certain public support systems for these farmers to continue planting these varieties. Such conservation, he adds, cannot be project based, but need to be part of a continuing national policy. He underlines the need for a two-tier policy, in which the benefits of advanced technologies in agriculture do not have to be rejected, but indeed are important for improving the productivity. Yet, at the same time, particularly for small farmers in mountain villages where most cultivation of landraces continue, there should be compensation mechanisms and production planning models that will reward these farmers.

As such, the role of the NGOs -particularly in the initial stages- in the process of framing the issue of biodiversity at the national level in Turkey needs to be underlined. One NGO located in Ankara, (TCSV), has played an instrumental role in bringing together the scientists and public officials in meetings on the conservation of biological diversity and genetic resources toward the end of 1980s, and publishing books. As Prof. Kence points out, these meetings and publications stimulated the Turkish state's biggest scientific research organization to undertake projects under his leadership for the conservation of biodiversity. While scientific research on biological diversity accelerated in this period, with the signing of the CBD and its ratification, the institutionalized channels by which scientists could provide direct input to the

[38] Interview with Prof. Neşet Kılınçer, executive secretary of the Agriculture, Forestry, and Food Technologies Research Grant Committee of TUBITAK.

formulation of policies regarding the conservation of biological diversity in Turkey were opened. The preparations of the government in order to fulfill the requirements of the CBD regulation provided the space for the scientists to take active part in the process of policy planning and making. This is in accordance with the constructivist approach, which proposed that the international regime/institution embodied by the CBD can be crucial in terms of providing the space for those domestic actors to incorporate their input into the policy making process for the conservation of genetic resources, with significant implications on the empowerment mechanism that Rosendal identifies. The next section will provide an analysis of the CBD implementation process in Turkey.

4.4.3. Turkey and the Convention on Biological Diversity

Turkey signed the CBD in 1992, and ratified it in 1997. As one of the obligations of the Convention, Turkey prepared the draft National Biodiversity Strategy and Action Plan (NBSAP). In 1995, there was an initiative to prepare a "National Environmental Action Plan" with the coordination of the SPO and the Ankara office of the World Bank. For its preparation, 12 study groups were established, including experts from universities, ministries, research organizations, NGOs and the private sector, and one these study groups worked on the Biodiversity Action Plan for Turkey. The NBSAP is a result of the initial work of this study group.[39]

---

[39] The NBSAP was prepared in cooperation with the related government institutions, universities and NGOs, under the coordination of the Ministry of Environment (MOE) and by the financial and consultative support of the Global Environmental Facility.

In the NBSAP, it is underlined that signing the CBD provided a new starting point for recognizing the importance of biodiversity and addressing related issues in Turkey. The aim of the strategy includes the assessment of the status of biodiversity in Turkey, describe a conservation strategy with the agreement of related public and private institutions, and prescribe the relevant actions that need to be taken in order to achieve the objectives of the CBD. It is emphasized that the NBSAP is a dynamic document, which will be updated and adjusted as necessary. The priority action plan within the strategy includes the establishment of protected areas and preparation of management plans; establishment of new wildlife sanctuaries, refugee centers, and arboretums; providing training on conservation concepts and principles for government staff and stakeholders; develop environmental public awareness and participation; and providing education for local communities on sustainable use of natural resources.

4.4.3.1. Follow Up Activities to the CBD: Projects on the Conservation of Genetic Diversity

One of the projects undertaken with the aim of conservation of genetic diversity is the Global Environmental Facility (GEF) funded *In Situ* Conservation of Plant Genetic Diversity Project that started in 1993 and was completed in 1998.[40] The project culminated in the National Plan for *in situ* conservation of plant genetic diversity in Turkey.[41] The aim of this pilot project was to develop *in situ* conservation concept to

---

[40] The Global Environmental Facility is the designated financial mechanism for the Convention on Biological Diversity. The GEF 1 project described started before the formulation of the draft NBSAP were under way.

[41] The National Plan for *In situ* Conservation of Plant Genetic Diversity in Turkey was prepared by three professors, Zeki Kaya, Ekrem Kün and Adil Güner under the coordination of MOE and the cooperation of MARA and MOF. Kaya and Güner are

conserve effectively genetic diversity of wild relatives of cultivated plants (such as wheat) and forest tree species that have global significance. Tan notes that this *in situ* project is the first of its kind in the world both for woody and non-woody crop relatives in an integrated multi-species and multi-site approach.[42] Three areas were designated for the project, with the components of site survey and inventories; designation of gene management zones (GMZs); and data management.[43] The national coordinator of the project was the Ministry of Environment (MOE), with Ministry of Agriculture and Rural Affairs (MARA) and Ministry of Forestry (MOF) as the implementing agencies. One important aspect of the project was the upgrading of the center laboratory for Geographic Information Systems (GIS) within the MARA, and the training of the personnel.[44] This center is aimed at assessing the status of biodiversity in all of Turkey as well as monitoring. One major objective of the pilot project is to provide the framework for future *in situ* conservation projects of plant genetic diversity in Turkey.

An important innovation that the project brought to *in situ* conservation idea was active management through Gene management zones (GMZs). GMZs are the natural and semi-natural areas protected with the purpose of maintaining genetic diversity in

---

from the department of biology, and Kün was from the department of field crops, faculty of agriculture.

[42] Ayfer Tan, "Current Status of Plant Genetic Resources Conservation in Turkey,"

[43] Ibid.

[44] The National Plan states that the project funding has equipped the institutes of MARA and MOF with new lab facilities and technical personnel in these institutes have been trained on *in situ* conservation of plant genetic resources. The trained group of personnel from three ministries (MARA, MOF and MOE), with the contributions from universities have formed the technical core personnel responsible in producing management and research policies for *in situ* gene conservation programs in Turkey. Yet, the need for more extensive education programs is also underlined.

target plant species. Close monitoring of the selected zones and observation of the changes in the vegetation, and the preparation of a plant inventory and evaluation of the changes in plant composition are to be integrated into the management plan of each GMZs.[45] One area that was selected for the project was Ceylanpınar State Farm located in the Southeast part of Turkey, which is part of the Fertile Crescent of the Near East Gene Center, where some cultivated plant species (i.e. einkorn wheat, red oats, chick pea) have originated. The project leader for this zone, Alptekin Karagöz indicates that after three years of survey and inventory studies, the changes that were observed in the vegetation were enormous due to grazing patterns, soil characteristics and environmental conditions. For example, target species found in some areas in the past were fully extinct, and at some sites, the floristic composition changed very rapidly.[46] Karagöz underlines that the project brought to the forefront the importance of monitoring and management to maintain the populations of target species at the desired level. During the project, two or three new species of wild wheat relatives were discovered, which are being evaluated for their potential to provide useful attributes to modern varieties of cultivated wheat.[47]

---

[45] Alptekin Karagoz, "In Situ Conservation of Plant Genetic Resources in the Ceylanpinar State Farm," in Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity, N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. (Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998).

[46] Ibid.

[47] Stan Krugman, consultant to the World Bank on the project and other GEF biodiversity related projects, quoted in *Diversity,* "Cutting Edge Conservation Techniques are Tested in the Cradle of Ancient Agriculture: GEF Turkish Project is a Global Model for *In Situ* Conservation of Wild Crop Relatives," Diversity 16, 4 (2000), 15.

This GEF project played a crucial role in the acceptance of the importance of *in situ* conservation, along with *ex situ* conservation within MARA, particularly in GDAR (General Directorate for Agricultural Research). Ayfer Tan underlines that the GEF project aimed to make *in situ* conservation integrated with the existing *ex situ* conservation program. She emphasizes that in the past, there had been little regard at the national, regional and global level to the conservation of plants that are agriculturally significant, as well as their progenitors and wild relatives in their native state.[48] With regard to agricultural biodiversity, one point that Tan notes is that local agricultural and agro-forestry farming systems may be difficult to sustain in the future. Since they become more assimilated into mainstream industrial society, traditional markets or indigenous germplasm exchange mechanisms may increasingly lose their importance, making it hard to find landrace seeds.[49] Thus, she argues, it is important to establish *in situ* conservation of plant genetic resources for food and agriculture as a permanent item on global and national policy agendas.

Vehbi Eser, a senior official of the MARA also indicated that the National Plan introduced the ecosystem approach to conservation in Turkey.[50] For example, he noted that there was a push for restructuring of the National Parks under the authority of the Ministry of Forestry, in which the ecosystem approach of the National Plan was taken

---

[48] Ayfer Tan, "Importance of Public Awareness and Coordinating Mechanisms of the In situ Activities in Turkey," FAO, Plant Genetic Resources for Food and Agriculture, Central and West Asia and North Africa Regional Meeting, 22-25 June, 1998, (http://www.fao.org/ag/AGP/AGPS/pgrfa/aleppo/ayfer.htm).

[49] Ibid.

[50] Interview with Vehbi Eser.

as a guiding principle. The aim of the GEF project, in addition to habitat protection for wild crop relatives and trees, is to make *in situ* conservation an integral part of managing state-owned lands since it will be related to the forest ecosystems protected under the national parks and reserve programs. While the ecosystem approach is embraced by the Ministry of Forestry, the monitoring and management planning of the National Parks is not yet a part of the conservation strategy.

With regard to crop genetic diversity, the National Plan underlines that while some farmers still prefer to grow landraces in marginal agricultural lands, for their better taste and resistance to environmental stresses, and long storage characteristics, these farmers should be recognized by MARA and local races need to be listed and monitored for the continuity of their genetic resources. The main causes of reduction in genetic diversity of landraces are seen in the changing agricultural practices, economic difficulties and new market demands. "The magnitude of this erosion is not known, so the list of primitive races need to be completed as soon as possible and conservation programs should be prepared. For example, measures can be taken to conserve the landraces in the field conditions by some socio-economic arrangements".[51]

In the pilot GEF project, landraces were not the focus. The reason for this was indicated as because the *in situ* conservation of landraces is very complex, involving biological, social and policy issues, and that this would sorely test the limits of a pilot project.[52] During the implementation of the GEF project, Fırat and Tan underline, one

---

[51] National Plan for In Situ Conservation of Plant Genetic Diversity in Turkey, (1998), 48.

[52] Ertug Fırat and Ayfer Tan, "*In Situ* Conservation of Genetic Diversity in Turkey," in Plant Genetic Conservation: The In Situ Approach, Nigel Maxted, Brian Ford-Lloyd, and John Gregory Hawkes , eds. (London; New York: Chapman & Hall, 1997). See

of the aims was to increase the institutional capacity of Turkey in the *in situ* conservation of landraces. One project that was started after the experience of the GEF project is "*In Situ* (on-farm) Conservation of Landraces in the North Western Transitional Zone of Turkey".[53] This project aims to analyze the conditions under which conservation of landraces of wheat, lentil, beans and chickpeas in the Aegean, Western Black Sea and Central Anatolian Transition Zones. AARI is responsible for the conduct and analysis of ecogeographic, socioeconomic and agro-morphologic survey data for the provision of geographic base data, and the GIS established with the GEF project is viewed as a significant element of it. The previous work of the AARI on landraces mainly focused on the collection of the material and their *ex situ* conservation mainly for breeding purposes. This is the first project in Turkey with the objective of *in situ* conservation of landraces, thus, it provides a significant starting point for future conservation efforts. With the analysis of the survey data, the aim of the project is to research and identify the conditions for and practices of on farm conservation of landraces with future policy implications. However, there are not yet mechanisms established in order to support the farmers who conserve genetic diversity on farm. Other than this project in its research phase, there are no concrete policies for further implementation for the *in situ* conservation of crop genetic diversity. One of the limitations indicated by the public officials is the lack of funds for expanding the areas for conservation of crop genetic diversity. One point frequently underlined is the

---

also article "Cutting Edge Conservation Techniques are Tested in the Cradle of Ancient Agriculture: GEF Turkish Project is a Global Model for In Situ Conservation of Wild Crop Relatives," Diversity 16, 4 (2000).

[53] Dr. Tan of AARI is the project leader.

limitations of internal funds for the continuation and the extension of these projects, and the significance of continuation of external funds. For example, Eser notes that the obligation stemming from the CBD about the conservation of agrobiodiversity is very significant, yet, there should be financial mechanisms for this to be realized.[54]

However, the MARA has other priorities and the budget for agricultural research is being squeezed by these priorities.[55] The share of total agricultural research expenditure in the national gross domestic product is 0.4 %, which is significantly lower than those of developed countries, which is approximately 1-2 %.[56] For example, Uzunlu et al. note that currently, governmental budget is the main source of finance for agricultural research and has been declining in the last years. In the future, they underline, public funds for agricultural research as well as public shares in total agricultural expenditures will be further decreasing. They also indicate that majority of state contribution (approximately 85 %) to agricultural research goes to salaries, and little remains for research operations. However, even though the state contribution goes to salaries, currently, incomes are quite low, and there is an emphasis on the need to improve the confidence, devotion and motivation of the researchers. Indeed, an agricultural researcher working in the CIMMYT office in Turkey noted the difficulty of keeping researchers in the GDAR departments because of the lack of incentives and

---

[54] One point that Eser notes is that the GEF priorities change according to the priority areas determined by the decisions of the COPs, which in some cases leads to a loss of insight on the overall protection of biodiversity.

[55] The *ex situ* and *in situ* projects are mainly conducted under agricultural research.

[56] Vedat Uzunlu, Fazil Düşünceli and Kenan Yalvaç, "The Future of National Agricultural Research System (NARS) of Turkey," in Ahmet Bayaner and H. Bozkurt (eds.) Science and Research Policy in Turkish Agriculture (Ankara: AERI, 1999).

financial considerations due to low incomes. These researchers, many of whom are sent by the government to get post-graduate training in foreign universities and come back to Turkey to work in GDAR leave their job position to financially more attractive jobs in the private sector. This creates important problems in terms of the continuity of research projects and having adequate human resources. In addition, political interference and bureaucratic procedures play an important role in staff recruitment and movement. This has to be minimized and research departments should be given responsibilities in staff recruitment[57]

Table 4.2. Project Investment Budget of the MARA for selected projects (million Turkish liras)

	2001	% of total	2003	% of total	2004	% of total
General Directorate of Agricultural Research (GDAR)						
Crop Research project	600 000	% 9.6	2 350 000	% 2.28	2 350 000	% 2.9
Project for conservation of plant species under threat in their ecosystems	60 000	% 0.96	90 000	% 0.08	85 000	% 0.01
Plant biodiversity conservation project	100 000	% 1.6	170 000	% 0.16	210 000	%0.26
Biosafety research and development project	120 000	% 1.93	215 000	% 0.2	225 000	% 0.27
Research and development of genetic resources etude project			100 000	% 0.09	100 000	% 0.12
Total project investment budget (agriculture)	6 194 000		102 975 000		80 688 000	

Source: MARA

[57] Ibid. Indeed, a personal experience showed this very clearly. In the attempt to locate a researcher for an interview whom I knew was working in the MARA, but could not find out which department, I realized that in the past two years, he was appointed to two different departments, and then got back to his initial post in the end.

Table 4.3: Allocation of resources to AROs in MARA compared with the priority rating for the same AROs

ARO (Area of Research Opportunities)	**Current %**	**Priority**
Cereals	21,0	**H** ↓
Oil seeds and food legumes	7,0	**H** ↑
Industrial crops	11,0	**H** ↓
Nuts	2,0	**M** ↑
Fruits	21,0	**H** ↓
Vegetables (ornaments)	15,0	**H** ↓
Processed food crops	< 1,0	**M** ↑
Pharmaceuticals and agricultural Chemicals	6,0	**L** ↓
Dairy and beef	5,0	**H** ↑
Sheep	2,5	**M** ↑
Feeds and forages	1,5	**M** ↑
Poultry and fish	4,0	**M** -
Apiculture and silk	0,5	**L** ↑
Processed animal products	< 1,0	**L** ↑
Natural resources base	< 1,0	**M** ↑

H: Highest priority (strong emphasis)
M: medium priority (selective emphasis)
L: Low priority (limited support)
↑ : increased future emphasis
↓ : decreased future emphasis
- : little change in emphasis
-

For the cereals, high priority research areas are determined by the GDAR as improving the quality and productivity of durum and bread wheat. For the natural resource base, the goal is to achieve greater biodiversity through the conservation of plant and animal resources, and to develop more sustainable production systems through conservation and management of soil, water and pests in cropping and rangeland grazing systems. High priority research programs include plant biodiversity and conservation, and improved fisheries stock management and resource management of economically important marine and freshwater stocks. High priority training needs are identified as plant conservation and *in situ* preservation, and fisheries stock assessment methodology.

Source: Kenan Yalvac,"Advanced Agronomic Training Needs and priority agricultural research in Turkey" *Options Méditerranéennes* 36, (1999).

In the Agricultural Research Master Plan (ARMP) for 2000-2005[58], for the section on natural resources and environment (priority-medium), the priority program is determined as the conservation of biological and genetic diversity of plants. The goal is to provide the sustainability of plant genetic resources and the prevention of genetic erosion. Mainly, the research program aims *in situ* and *ex situ* conservation, extension of the collections, evaluation of the material and the provision of public support and awareness for the sustainability of these resources. In the plan, it is underlined that the rich biological and genetic diversity of Turkey is under threat due to a number of factors. In the short term (0-5 years), the work programme is summarized as follows: conservation work subjects will be determined, with a particular emphasis on the complementarity of *in situ* and *ex situ* conservation, and a new gene bank will be established. For the medium term (5-10 years), regional and crop species priorities will lead the surveys, *in situ* and *ex situ* conservation efforts will continue, and on farm conservation methodology development will be completed. The Plan also underscores the importance of and the need for conservation of landraces and the necessary incentives to be provided for the producers of landraces, and advise the decision makers on these measures.

4.4.3.2. The Use of Symbolic Language

The national programs and projects (the GEF and the on-farm conservation of landraces) described point to the follow up activities to the CBD which Turkey has undertaken that Rosendal has proposed as one of the indicators of implementation of the

[58] The plan was prepared by the MARA (GDAR) with support from the World Bank.

CBD. In terms of the symbolic language that is being consistently used, it is useful to analyze the extent to which the norms of the CBD have been adopted in official documents as well as by the policy makers. In the interviews that I have conducted with public officials in the MARA, MOF and MOE, it has frequently been underlined that the genetic resources of a country are national assets, such as minerals or oil. Thus, the general agreement is that the recognition of the national sovereignty over genetic resources in the CBD is a significant first step in the efforts towards conservation of biological diversity. For example, Kenan Yalvaç notes that the genetic resources of Turkey, particularly wheat diversity, is a national treasure the value of which has not yet been understood appropriately.[59] However, there is also an emphasis on the importance of not viewing these resources as mainly a natural resource base to be taken advantage of simply in economic terms.

With reference to the equitable sharing objectives of the CBD and in terms of its overlap with the TRIPs, Vehbi Eser has indicated that there is a contradiction in free access to genetic resources and leaving the responsibility of conservation of genetic resources solely to the country of origin.[60] The importance of compensation for the conservation of genetic resources is often emphasized. Also, the Turkish delegation in a draft statement have underlined that review process of the TRIPs agreement should take into account the natural rights of the country of origin on the genetic resources through the conservation and sustainable use of biological diversity for the benefit of the

---

[59] Interview with Kenan Yalvaç. Head of Seed Division, MARA. Yalvaç noted that this value should not be understood simply as material value, but a richness with its folkloric traditions and knowledge associated with it.

[60] Interview with Vehbi Eser.

mankind, and as a result, the context of the related article of TRIPs should be harmonized through and should be mutually supportive with the related articles of the CBD.[61] Also, it is stated that the review process of the TRIPs article 27.3.b should be expanded in order to be able to clear out the implications of TRIPs on the farmers, biodiversity conservation objectives, and protection systems.[62] In the preliminary report submitted to the CBD, it is emphasized that the main contradiction arises from lack of benefit sharing agreements in favor countries of origin of biological diversity and traditional knowledge and weak capacities of developing countries at system, institution and human resources levels to follow up means of commercial use of their own resources and knowledge. It is stated that patenting systems should not discriminate between traditional methodologies and modern techniques with regard to biological entities and processes.

In a background report on genetic resources, traditional knowledge, folklore and intellectual property present situation in Turkey, it is indicated that about half of the population of Turkey is living in rural areas, and their activities have a great effect on

---

[61] The review process was on the article 27.3.b of TRIPs, which indicates that patentability can be exempted from "plants and animals other than micro-organisms, and essentially biological processes for the production of plants and animals other than non-biological and microbiological processes.", however, this exemption is conditional on the existence of a system for the protection of plant varieties either by patents or by an effective *sui generis* system. See Calestous Juma, "Intellectual Property Rights and Globalization: Implications for Developing Countries," Science, technology and Development Discussion Paper No.4, Center for International Development, Harvard University, 1999).

[62] Communication from Turkey: Draft Statement by Turkish Delegation regarding the review of the 27.3.b.

the genetic resources.[63] The report emphasizes the existence of a great diversity in the living styles and settlements in the rural areas, the traditional approaches and customs which make use of these resources are conserved by the rural communities. For example, rich plant genetic resources are widely used for different purposes like food, drug, and wood, and various local production techniques are developed and used. Yet, one point that should be underlined is that there is no database that compiles the traditional knowledge of rural communities that exist in Turkey. There is widespread agreement among the public officials of the significance of this knowledge, particularly with reference to medicinal characteristics of certain plants (including endemic) which have been used by rural populations as part of their folklore for years.[64] Yet, also viewed important are the knowledge of farmers about the characteristics of crops that they are planting. Thus, one effort cited by the officials is by the MARA and the TPE is the collection of traditional knowledge and construction of a database that will serve as a reference in future transactions for bio-prospecting agreements. This project is yet in its infancy.

4.4.3.3. The Policy Instruments for the Conservation of Biological Diversity

In terms of the policy instruments, the National Plan for *in situ* conservation of plant genetic diversity states that the studies related to plant genetic diversity in the

[63] The report was prepared in collaboration with the TPE, the MARA and Undersecretariat of Treasury for the World Intellectual Property Organization (WIPO) meeting in 2001.

[64] It should also be noted that Turkey does not see traditional knowledge as indigenous knowledge, stating that there are no indigenous groups in Turkey. So their understanding is the broader definition of traditional knowledge.

forest areas are conducted by the governmental organizations through programs with different status such as the National Parks, Nature Conservation Areas, Natural Monuments, Seed Stands, and Gene Conservation Forests, all under the MOF. However, the National Plan also underlines that these programs need to be reviewed in terms of their size, distribution, administration, and management policy "by taking biodiversity and *in situ* gene conservation principles in order to have an effective *in situ* gene conservation program in the whole country."[65] The aim is to carry out the GMZs in other places nationwide. Thus, the NBSAP includes in the general actions that need to be undertaken the development of *in situ* protected area network; making environmental impact assessment (EIA) mandatory for all newly planned physical investments in all sectors; making planning for protected area management to be 'area' and 'species' based; tight control of introduction of exotic species, among others. Strategic actions include modifying or eliminating elements of government policies and programs that create unintentional adverse impacts on wild flora and fauna on private and public properties; maintaining and improving measures that prevent *in situ* populations from becoming jeopardized by specimen collecting for *ex situ* conservation and other purposes; ensuring that both economic and ecological factors are considered in implementing pest management strategies; as well as assessing current and proposed major government agricultural policies and programs to ensure that ecological objectives are considered, for example, through developing economic incentives that promote the conservation of biodiversity and sustainable use of biological resources on

[65] The National Plan for In Situ Conservation of Plant Genetic Diversity (1998).

agricultural lands, among a number of other recommended actions. Yet, in terms of actual implementation, these actions mainly remain as recommendations.

4.4.3.4. Institutional Changes

With reference to institutional changes in related government bodies, one point that is frequently underlined is that a clear delineation of the responsibilities of implementing and coordinating agencies do not exist. Overlaps in institutional responsibilities often create problems in the designation of policies, which areas to give priority to in terms of conservation activities, and in the implementation process. The Ministry of Environment, which was established in 1991,[66] has the responsibility of creating policies, planning and coordination and public awareness on biodiversity, whereas the management and conservation of natural resources reside in the responsibility of Ministry of Rural Affairs and Agriculture and the Ministry of Forestry. One problem that has been frequently underlined is the staffing constraints of the Ministry of Environment, making enforcement of regulations very difficult. For example, in the implementation of the GEF1 project, changes at the ministerial level and frequent agency reorganization resulted in a lack of continuity of responsible staff during the project's early phases, prevented timely and effective implementation of MOE's responsibilities.[67] Towards the end of the project, a new MOE project coordinator was able to get the agency back on track. In 2003, the new government of

[66] The Secretariat of Environment was established in 1978 under the Prime Minister's office. In 1984, it became the Environmental General Directorate, and later restructured as the Secretariat of Environment in 1989.

[67] "Cutting Edge Conservation Techniques are Tested in the Cradle of Ancient Agriculture: GEF Turkish Project is a Global Model for In Situ Conservation of Wild Crop Relatives" Diversity 16, 4 (2000).

Turkey again made changes in the structure of the ministries, combining the Ministry of Environment with the Ministry of Forestry. The department responsible from conservation of nature within the Ministry of Environment is now part of the Directorate of National Parks of the Ministry of Forestry. The process of reorganization is still continuing.

In fact, there are serious problems in terms of the perceptions and relations between the ministries. The MARA and MOF usually compete for limited resources, both internal and external. Overlaps in responsibilities contribute to this competition. One example that reflects this competition was a GEF/UNEP project that was prepared by FAO in 2002 on the regional conservation of wild relatives of crops. In the initial plan of the project, the MOF was designated as the coordinating agency, but this was strongly resisted by the MARA on the basis that the conservation of plant genetic resources resides within the responsibility of the MARA. There was also a strong criticism by the MARA that a foreign institution can not determine which domestic agency will assume the responsibility, and there should be an internal mechanism for this to be decided. At the end, the coordination was given to the MOE.

4.4.3.5. Legal Framework

As for the legal framework on regulating biological diversity, article 63 of the Constitution, adopted in 1982, states that the government should protect the historical, cultural and natural values and resources of the country, and support and promote the conservation efforts made by the people. The Environmental Law (1983); National Parks Laws (1993); Law for Specially Protected Environmental Areas (1988); Forestry Law (1956, 1983, 1986) provide the context within which protection of nature are

coded. The regulations passed by the Ministry of Agriculture and Rural Affairs mainly aim specifically at conservation of plant genetic diversity, and these include:

- Regulation on the collection, storage, and use of plant genetic resources (1992)
- Regulation on the collection, production and export of wild flower bulbs (1995)
- Regulations on the collection of plant materials in Turkey.

However, as the NBSAP also indicates, the laws and related regulations need to be reviewed in order to design management policies concerning the implementation of the provisions of the CBD. It is stated that Turkish legislation has not been harmonized from a consistent environmental point of view leading to problems of overlap, and lack of legal mandate for institutions. Indeed, a new project funded by the GEF has been undertaken, namely, the project on the assessment and rationalization of the legal framework of Turkey with regard to conservation of biological diversity. This project is part of second GEF project on biodiversity and natural resource management. Thus, this project may provide to be the starting point for the harmonization of existing laws with reference to conservation of biological diversity.

4.4.3.6. Local Participation in the Conservation of Biological Diversity

Finally, in terms of local participation, the importance of the participation of stakeholders is frequently underlined in the NBSAP as well as the National Plan for *In Situ* Conservation of Plant Genetic Diversity. For example, the latter indicate that in terms of economic evaluation of conservation of plant genetic resources, it is important

to underline the possible negative economic impacts on local people with the establishments of the gene management zones, pointing to the preventive or compensation measures. In the NBSAP, one of the priority actions is to ensure the participation of local communities and NGOs in preparing as well as implementing management plans. In the interviews, the public officials mainly underlined the significant role that NGOs could play particularly in regions where there is a lack of trust to the government personnel. The GEF project was one of the instances in which NGOs were active participants in the implementation process, mainly in terms of education and raising awareness about the significance of sustainable use of these resources among the local populations who were residing in the areas where GMZs were declared. One interesting point underlined by a public official from the Ministry of Environment was that the project was a very important learning process for the state. Contrary to the expectations, it became apparent from the work of NGOs that the local people were in fact engaging in practices that did not harm the diversity that was targeted to protect. It was mainly the nomads who stayed in the region for short periods of time engaging in the unsustainable use of these resources. However, another implication that reflected the lack of trust of state officials was that the communities initially became afraid that the GMZs meant that the area they were residing was going to be a National Park. They expressed their uneasiness because they thought that they would no longer be able to use the resources that they are using for their livelihoods anymore. In that instance, the existence of NGOs played an important role in convincing the local communities of the aims of the project.

While there are a number of environmental NGOs in Turkey that engage in biodiversity conservation practices, such as the Association for the Protection of Natural Life, Turkish Society for Protection of Nature, Turkish Environmental Foundation, there are not many that directly deal with the conservation of plant genetic diversity. One exception is the Research Association of Rural Environment and Forestry, which has undertaken projects such as the participation of the local people in *in situ* conservation of plant genetic resources in Gevne. The GEF Small Grants Programme, under UNDP, funds a number of projects undertaken by local NGOs for the protection of local biodiversity with the participation of local populations. Yet, while there has been a steady increase in the number of these projects, it is too early to conclude that there is a genuine participation of the local population in biodiversity conservation.

Some of the NGOs collaborate with scientists based in universities in the formation and the realization of projects on the conservation of biodiversity. A recent example of this was the project titled "Turkey's Important Plant Areas" that was

The GEF/SGP became operational in Turkey in 1993, and in the period between 1993-98, 30 projects were supported through the GEF/SGP. GEF/SGP in Turkey is eligible for making grants under the focus areas of biodiversity and international waters. In the second operational phase program, (2000-2004), projects that would be funded included ones that support or promote the conservation and sustainable use and management of biodiversity in ecosystems (including agrobiodiversity and agroecological systems). The operational programs were restricted to *in situ* conservation activities and the conservation of genetic variability of wild relatives of domesticated species. Some of the projects approved in 2000 and 2001 include

(1) Training programme for *In situ* protection of biodiversity, Research Association of Rural Environment and Forestry.
(2) Raising Teachers' and local governors' awareness on biodiversity and nature conservation in the rural areas of Kastamonu, Turkish Association for the Conservation of Nature.
(3) *In Situ* protection of the gene resources in Karacadağ, Sustainable Rural and Urban Development Association.
(4) Conservation of Ağrı Dağ's biodiversity, especially of threatened fauna species, Doğubeyazıt association for Environmental protection.
(5) Local Solutions to Biological Diversity Conservation in Gökova, Protected Special Area, Friends of Gökova.

Source: GEF Small Grants Programme, Turkey.

Figure 4.1. Selected projects funded by GEF Small Grants Programme

undertaken by the Association for the Protection of Natural Life, written by Prof. Melahat Ozhatay, Andrew Byfield, and Sema Atay, a comprehensive study identifying the specific key sites for the protection of rare species and habitats.[68] The inventory comprises 122 site accounts, with a total size of 11,000,000 ha (13 % of Turkey's total area). The study emphasizes that the threats facing the Turkish IPAs are diverse, ranging from agricultural reclamation, intensive forestry, and industrial/ urban development, to less obvious threats including the collection of species for trade, and the spread of invasive alien plant species into the environment.

While there is an increasing recognition by the public officials of the importance of NGOs, there are certain reservations about the extent of the roles these NGOs should play. For example, one point that is commonly emphasized is that NGO role should be limited to education and raising public awareness, but that implementation should be the responsibility of government agencies. NGO participation in the process of policymaking is viewed as very important, yet the channels for this participation are rather limited. One mechanism that the NGOs can participate in the planning phase of the policies is that they are invited to meetings of work groups arranged by the MOE, SPO and MARA, however, the extent to which NGOs are able to influence the particular policies decided is open to question. That said, it should be underlined that

---

[68] Melahat Ozhatay, Andrew Byfield and Sema Atay, *Türkiye'nin Onemli Bitki Alanları* (Turkey's Important Plant Areas) (WWF Turkey: Doğal Hayatı Koruma Vakfı, 2003). It is noted in the study that after a feasibility study, identification and assessment of the Important Plant Areas (IPAs) was undertaken in 1998 with the contribution of approximately 40 scientists from 20 universities, along with many other researchers and institutions.

some NGOs have been able to express their viewpoints in various meeting that they organize and invite public officials in related ministries and agencies.[69]

To summarize briefly, the implementation of the GEF project provided a policy tool by the construction of GMZs for the *in situ* conservation of plant genetic diversity, and bringing technical assistance by building and upgrading the GIS base and the training of the personnel. Bioinformatic capacity building was a major element of the project. New data capabilities in GIS and GPS were established, as well as a database management system specifically designed for plant genetic resources conservation. The latter, created by the National Plant Genetic Resources Research Program of Turkey, includes passport information, and information on characterization, evaluation, storage, conservation, and ecogeography.[70] The isoenzyme-analysis studies of genetic variation that were done in the course of GMZ selection also helped Turkish government researchers acquire additional skills and equipment, whereas previously, such analyses were done on a small scale in Turkish universities. As the project proceeded, academic researchers worked with government researchers. For example, Prof. Zeki Kaya indicated that in the project implementation process, a core group of government officials and researchers participated in the workshops that were organized and worked

---

[69] For example, the TCKV have been organizing meetings on the conservation of biological diversity, as early as 1987 which was discussed above, bringing scientists as well as public officials together. A recent meeting was in 2003, where the implications of genetically modified organisms on the biological diversity of Turkey and their possible impact on human health was discussed. There was a widespread participation by government officials from MARA, SPO, MOE and TPE, as well as scientists.

[70] "Cutting Edge Conservation Techniques are Tested in the Cradle of Ancient Agriculture: GEF Turkish Project is a Global Model for In Situ Conservation of Wild Crop Relatives" Diversity 16, 4 (2000).

with academic researchers.[71] This was an important educational process in terms of *in situ* conservation of genetic diversity. Fırat and Tan also emphasize that this complex project required the coordination and communication between different governmental levels and scientific disciplines as part of the institutional strengthening process.[72] They identify three ways in which institutional capacity and flexibility in planning and implementing *in situ* conservation can be built: research, training, and formation of linkages between the formal and non-formal (NGO) sectors. The project also pushed for the preparation of the National Plan for *in situ* conservation, and provided insights for the state in terms of the importance of the participation of local groups as well as the role of NGOs in the conservation process.

After a discussion of the conservation of plant genetic resources activities in Turkey, the following section will proceed with an analysis of the recent agricultural policies and the linkages between this process of liberalization and conservation of agricultural biological diversity. As I noted at the beginning of the chapter, it is important to analyze how the CBD as an international environmental institution/regime overlaps with the requirements of the neoliberal economic institution/regime, and how this is reflected at the domestic policy making level, as well as at the local level agricultural practices of the farmers. I pointed out one possible contradiction between the two, which could be reflected in the CBD implementation process, regarding the integration of conservation and sustainable use of biological diversity into sectoral and cross-sectoral plans, programmes and policies. Turkey, as a government under IMF/WB

[71] Interview with Prof. Zeki Kaya, Middle Eastern Technical University. Prof. Kaya is one of the authors of the National Plan for In Situ Conservation of Plant Genetic Diversity.

directed restructuring may emphasize the priority of agricultural efficiency in production and thus it may become difficult and costly to integrate the conservation and sustainable use of biological diversity into the agricultural sector. This is linked to the earlier discussion of conceptual nesting of the two institutions/regimes. At the same time, the agricultural practices of the farmers who conserve crop genetic diversity (as well as those who don't) are embedded within the broader agricultural framework envisaged by the reform process. The agricultural restructuring may pressure farmers to turn to modern varieties to increase productivity, convert to other crops than those with high diversity, or abandon agriculture altogether, which will lead to genetic erosion. The next section provides an analysis of the agricultural reform, with a particular focus on wheat.

4.5. The Agricultural Restructuring: IMF and the World Bank

In the 1950s, agriculture in Turkey employed 80 % of the labor force, and produced 50 % of the total GNP. In 1960s, the share of agriculture in total GNP was 40 %, and this has fallen to 15 % by the end of 1990s. However, despite the fact that agriculture's share in GNP dropped dramatically, in 2000, it employed 46 % of the labor force. Turkish agriculture underwent a period of modernization since the 1960s, when machinery and agricultural inputs such as fertilizers, pesticides and improved varieties of seeds started to be commonly used by the farmers. State support for the agricultural sector goes back to 1930s, and various policies have been adopted, mainly

[72] Ertug Fırat and Ayfer Tan, "*In Situ* Conservation of Genetic Diversity in Turkey."

in the form of price supports, agricultural subsidies and credits. In 1980s, when there was an extensive liberalization of the economy, the agricultural sector also underwent certain changes, such as the privatization of seed provision, and opening of the market to imports. It should be noted that during that period, there was a reduction in the list of supported crops with priorities shifting from traditional crops to industrial ones, as well as a decline in subsidies, yet, after 1990, the coverage of price support was widened again.[73] Oguz Oyan divides the 1990s into four subgroups to describe this decade of rather unstable agricultural policy: a) 1991-93: expansion of agricultural support; b) the contraction of 1994-95; c) 1997-98: resumption of expansion; d) 1999-2000: relapse into contraction.[74] Frequent elections in this period, coupled with the effort to form a policy in line with the recommendations of the IMF and the World Bank were the reasons for the fluctuations in agricultural support policies.[75]

The most dramatic restructuring of the agricultural sector came as Turkey has recently adopted a set of policies towards liberalization of domestic prices under the guidance of the IMF and the World Bank. One element of these policies include a program of structural reforms aimed at elimination of producer subsidies in agriculture, and introduction of direct income transfer model.[76] Mine Eder notes that parallel to the

---

[73] Fatma Doğruel, Suut Doğruel, and Erinc Yeldan, "Macroeconomics of Turkey's Agricultural Reforms: An Intertemporal Computable General Equilibrium Analysis" Journal of Policy Modelling 25 (2003): 617-637.

[74] Oguz Oyan, "From Agricultural Policies to an Agriculture without Policies" in Ravages of Neoliberalism: Economy, Society, and Gender in Turkey, Nese Balkan and Sungur Savran eds. (New York: Nova Science Publishers, 2002).

[75] Ibid.

[76] Doğruel et al.

IMF neoliberal agenda, the fundamental problem in Turkey's agriculture was identified by the World Bank as government intervention and market-distorting subsidies.[77] The Bank approved $600 million dollars for the Agricultural Reform Implementation Program (ARIP) in 2001. In the ARIP, it is stated that the overall aim of the program is "dramatically reducing the artificial incentives and government subsidies, and substituting a support system that will give agricultural producers and agro-industry incentives to increase productivity in response to real competitive advantage". The main focus of ARIP thus have been on approximating agricultural prices in Turkey with world prices, eliminating all agricultural subsidies and eliminating or reducing credit channels and privatizing State Economic Enterprises (SEEs) and Agricultural Sales Cooperatives (ASCUs).[78] In a letter of intent that was submitted to the IMF in 2000, the government states that in the agricultural sphere, the intent is to break with the past once and for all, in order to boost growth and reduce the burden of agricultural support policies on the budget and the consumers, and the agricultural reform program foresees the removal of the state from its direct role in agricultural production, and the privatization of state property in the sector in the intermediate term.

---

[77] Mine Eder, "Political Economy of Agricultural Reforms in Turkey," in *La Turquie et le développement*, Ahmet Insel ed. (Paris: L'Harmattan, 2003), 211-245.

[78] Ibid. For example, SEEs include institutions such as TEKEL (Turkish Tobacco Monopoly), and Soil Products Office (which purchases main products like wheat at a guaranteed price). ASCUs engage in marketing, as well as provision of seed, fertilizer and pesticides to producers. Doğruel et. al. note that Turkish agricultural support policies are financed from three sources: Budget, Price support and stabilization fund, and Agricultural Bank's loans).

Table 4.4. Main Agricultural Indicators in Turkey

Total land area (1000 HA)	76 963
Land use: Arable land: Arable land + permanent crops:	 24 138 26 672
Irrigated Land:	4 500
Agricultural GDP as share of total GDP: 2000: 2003:	 16.2 % 13.4 %
Food consumption 1999-2001 (share of total dietary energy supply) Wheat and products: Sugar and products Milk and products (excluding butter)	 43 % 8 % 6 %

	1979-81	1989-91	1998	1999	2000	2001
Rural/total population	56 %	39 %	35 %	35 %	34 %	34 %
Agricultural labor force/total labor force:	61 %	54 %	48 %	47 %	46 %	45 %
Fertilizer use /arable land (kg-nutrs/HA)	53	74	89	91	87	
Tractors/arable land (no/1000 HA)	16.9	27.8	36.9	37.5	37.5	

Source: FAO, Food and Agriculture Indicators, Country: Turkey

The direct income system is a major component of ARIP assisted by the World Bank. It is introduced to replace all other forms of state support, including administered prices, output and input subsidies. It mainly refers to the payment of a certain amount of money to the owners of agricultural land per hectare. Initially, the DIS payment was made to owners of land up who owned up to 20 hectares, after two years of this implementation, it was increased to 50 hectares.[79] The aim of limiting the hectares was based on the objective of supporting small farmers. The basis of DIS payments has been

[79] Thus, starting in 2001, the DIS program has made annual payments of approximately 90 $ per hectare to the farmers who benefited from the program.

the use of cultivated land, with no production restriction. As such, one aspect of the system in its implementation in Turkey is that there is no production planning attached to it.[80] Another implication of the system is that due to lack of systematic documentation on the land ownership, it is not hard for big landowners to divide up their land and show false documentation under different names in order to benefit from the income.

The World Bank insisted on decoupling[81] of farm support while the MARA insisted on coupling it with production so that the system could be used as a mechanism for organizing production. Yet, the World Bank rejected this on the account that the direct income in the absence of decoupling would be trade-distorting and would not meet the WTO standards.[82] Eder also notes that MARA's insistence of mapping the crop distribution while registering the producers was also rejected as it was feared that it would complicate the program and delay its implementation, which meant that the government would not be able to use the system to direct the farmers to some form of production organization.[83] In addition to the DIS, which is granted on annual basis, a

---

[80] This, some argue, may result in the payments to certain landowners, who may be residing in the city or town but not necessarily engage in agriculture. In fact, such instances were articulated by the farmers I interviewed in both Balikesir and Eskişehir.

[81] Decoupling is the replacement of agricultural support programs which are based on current production and prices with direct payments that is based on clearly defined and fixed measures. See John Baffes and Harry de Gorter, "Decoupling Support to Agriculture: An Economic Analysis of Recent Experience," Paper presented at Annual Bank Conference on Development Economics-Europe, Paris, May 15-16, 2003.

[82] Mine Eder, "Political Economy of Agricultural Reforms in Turkey,"

[83] Ibid.

one-off farmer transition payment was granted to cover the cost of diverting from agricultural commodities, namely, hazelnuts and tobacco, to other commodities.

In terms of agriculture support prices, the set of policy changes included the introduction of a link between support prices and relevant world market prices, and initiation of a phase out of government subsidies via support prices by 2002. For example, the support price for wheat in 2000 was linked to world reference, and set at a level which reduced the premium over the world price to approximately 35 percent. In the grains sector, the Soil Products Office-Turkish Grain Board (TMO) reduced its volume of intervention purchases by over 45 percent from 1999-2001 to about 2.4 million tons. In 2002, these purchases were reduced to 800,000 tons. Wheat import tariffs were also reduced substantially, though they remain at about 45 %. In 2003, wheat imports totaled 1,8 million tons.

Table 4.5. Wheat Production Indicators in Turkey

Wheat Statistics	1981	1991	2000	2001	2002	2003/2004 (market years-projected)
Area Sown (ha)	9 250 000	9 630 000	9 400 000	9 350 000	9 300 000	9 300 000
Production (tons)	17 000 000	20 400 000	21 000 000	19 000 000	19 500 000	21 000 000
Yield (kg/ha)	1 838	2 118	2 234	2032	2101	2 258

As protection in grains started to be reduced in 2000, there was compliance with the commitment that the prices paid for support purchases would not exceed the targeted inflation. For 2000, Oyan underlines the difference between the realized rate of inflation (39 %) and the targeted rate (25 %), as a measure of the real erosion in farmers' income.

Table 4.6. Exports and Imports of Wheat[84]

	1981	1991	2000	2001	2002
Export: Quantity (in thousand tons)	316	2307	1780	1118	55
Import: Quantity (in thousand tons)	272	198	963	347	1117

Source: State Institute of Statistics, and Wheat: Situation and Outlook 2003/2004.

In a review published by the World Bank of the impact of the reform of agricultural sector subsidization, it is indicated that between 1999-2002, agricultural prices in real terms declined by 13 percent and by 22 % when measured relative to non-agricultural prices.[85] The same study reports that within agriculture, crop prices fell by 23 percent relative to input prices. Prices of crops such as tobacco, sugar beet and hazelnut[86] fell the most, between 25-50 percent in real terms, grain (wheat, barley and

[84] It should be noted that there are great fluctuations in the quantity of wheat being imported and exported. Braun et al. note that, the conditions in Anatolia is ideal for the production of quality wheat, yet, Turkish wheat at present does not satisfy the demands of the Turkish millers and bakers for industrial quality standards, and higher quality wheat is imported each year, even in years with a surplus supply.

[85] Mark Lundell, Julian Lampietti, Rashid Pertev, Lorenz Pohlmeier, Halis Akder, Ebru Ocek, and Shreyasi Jha, "Turkey: A Review of the Impact of the Reform of Agricultural Sector Subsidization," Environmentally and Socially Sustainable Development Unit Europe and Central Asia Region (The World Bank, 2004).

[86] One component of the program is the alternative product project, in which one time payments are offered to hazelnut and tobacco producers, and is designed to help cover the transitional costs of switching to other crops. The project will finance the input (seed, seedling, fertilizer, chemicals and diesel) costs for the new crops selected from a menu of options. (i.e. for hazelnut, the menu of options include maize, soybean, canola, sunflower, potato, vetch dry beans, protected and field vegetables, aromatic and medicinal plants, etc. For tobacco, the options include wheat, sunflower, canola, chickpea, dry beans, lentils, maize, soybean, cotton etc. The area to be reduced for hazelnut was designed as 100, 000 ha. For tobacco, this was 36, 000 ha. However, the review by Lundell et al. notes that participation in these programs are not robust, and

maize) prices also declined by about 5 to 10 percent because of reduced government intervention.

In terms of the agricultural price squeeze, the following graphs provide some information. The first graph shows the falling real output/input price ratio by comparing real prices of one kg of wheat with one liter of diesel. In this graph, we see that the cost of diesel in terms of wheat has gone up. In the second graph, we observe how the real output/input price ratio falls by looking at the changes in the prices of two chemical fertilizers that are most frequently used in wheat production.

According to the results of the ARIP Quantitative Household Survey Data (QHS) that was conducted in November-December 2002, in terms of the land sown to grains, mainly wheat and barley, the share of agricultural land have fallen about 2.0 percentage points (a 4 percent reduction) in 2002 when compared to 2001, while the shares to sunflower and fruits and vegetables have increased by about 2.4 and 1.2 percentage points respectively.[87] This, the authors of the review argue, is in line with what would be expected as a result of the agricultural reform policies which led to significantly reduced grain support as well as greater attractiveness of sunflower seed (which is still accorded high support), and fruits and vegetables.

---

that the farmers are not really convinced that the government will continue to reduce its presence in agricultural marketing in those sectors.

[87] The review by Mark Lundell et al. informs that this is a household survey of 5508 households conducted in 500 rural villages, and it was designed to be representative of farming households which were engaged largely in cultivation of the formerly most highly subsidized crops (tobacco, sugarbeet, hazelnut and grains). The comparison of 2002 household data was through the aggregation of household data to the regional level, comparing this with 2001 State Institute of Statistics (SIS) regional data on the share of the area sown under different crops.

The authors also constructed a model of gross agricultural income based on the QHS data set, with variables for a number of crops (tobacco, wheat, maize, barley, sunflower, sugarbeet, and fruits and vegetables) to explain the impacts of area shifts observed in the reform period and the DIS program on agricultural income levels. According to this analysis, those households with greater relative wheat specialization, tobacco specialization and barley specialization all experience a significantly negative impact on agricultural income.

In terms of the environmental aspects of the ARIP implementation, in the project information document, it is noted that the minor environmental risks are related to the potential improper removal of hazelnut trees from areas not targeted for transition to other crops, and compliance with environmental regulations governing closure of agroindustrial enterprises (such as cotton ginning plants, packing houses, warehouses etc.) that may occur in connection with the restructuring of ASCUs (Report No. PID9405). One point that was underlined by Ahmet Levent Yener was that there was a concern in the process of the implementation of direct income system whether this might lead to the expansion of agricultural activities to certain areas including forestry areas that might be rich in biodiversity.[88] Such activities, he noted, can be destructive of

[88] Interview with Ahmet Levent Yener, the Head of Department, General Directorate of State Owned Enterprises, Republic of Turkey Prime Ministry, The Undersecretariat of Treasury.

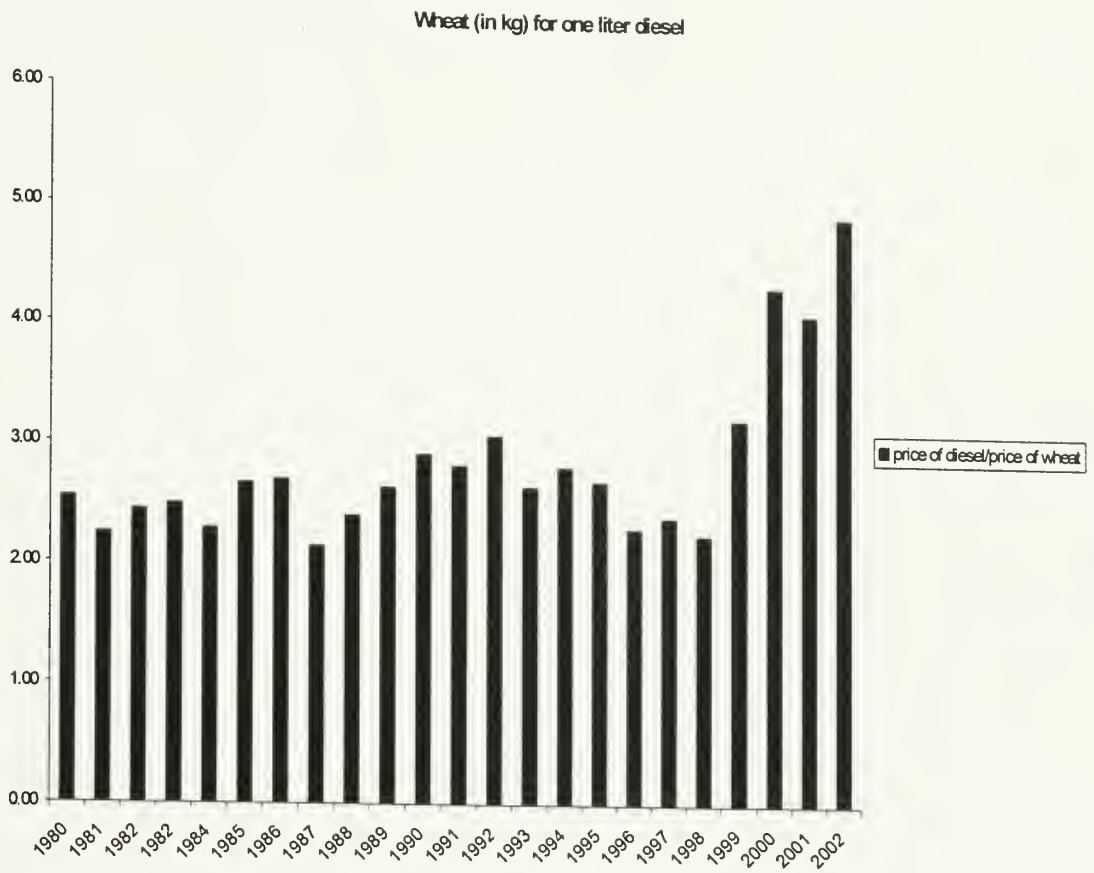
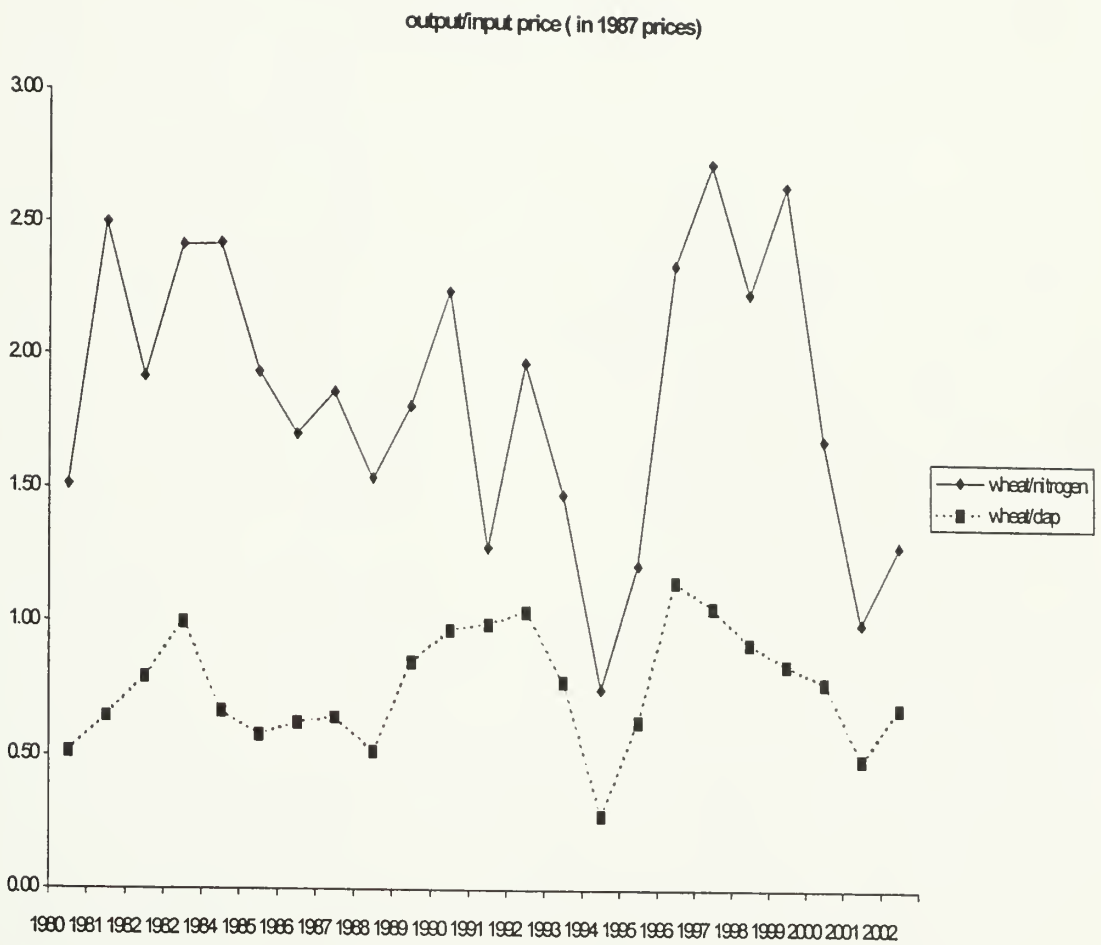


Figure 4.2. Input/Output Ratio for Wheat Producers

Continued, next page.

Figure 4.2, cont'd.:



the biological resources in these areas. The motive for this might be to benefit from the income that was being distributed. However, there were not measures that were undertaken to address this concern.

Table 4.7. Changes in Crop Area Shares: 2001-2002, Regionally and Nationally

From QHS Sample-2002:

	Marmara	Aegean	Med	Central Anatolia	Black Sea	East Anatolia	S.E. Anatolia	Turkey Total
Tobacco	0.3 %	6.6 %	0.1 %	0.0 %	1.7 %	0.4 %	1.5 %	1.5 %
Wheat	43 %	22.3 %	53.0 %	54.6 %	22.7 %	51.3 %	45.8 %	43.0 %
Maize	2.1 %	4.9 %	10.2 %	0.5 %	7.0 %	0.4 %	0.7 %	3.5 %
Barley	5.5 %	11.9 %	2.4 %	27.3 %	3.5 %	28.5 %	13.9 %	14.3 %
Sunflower	30.2 %	0.2 %	0.8 %	2.3 %	1.2 %	0.0 %	0.0 %	4.9 %
Sugarbeet	0.5 %	7.9 %	0.5 %	5.4 %	2.5 %	3.9 %	0.0 %	3.3 %
Fruits and vegetables	9.5 %	16.1 %	16.2 %	9.2 %	57.0 %	4.1 %	13.6 %	17.0 %

2001 Base data:

	Marmara	Aegean	Med	Central Anatolia	Black Sea	East Anatolia	S.E. Anatolia	Turkey Total
Tobacco	0.6 %	4.1 %	0.3 %	0.0 %	1.2 %	0.2 %	0.5 %	0.9%
Wheat	47.6 %	31.8 %	51.1 %	52.4 %	36.5 %	54.3 %	39.8 %	45.0 %
Maize	1.9 %	1.8 %	8.5 %	0.1 %	10.0%	0.1%	0.3 %	2.7 %
Barley	6.4 %	16.1 %	6.1 %	25.5 %	9.7 %	21.0 %	24.5 %	17.6 %
Sunflower	16.5 %	0.8 %	0.9 %	0.9 %	0.9 %	0.2 %	0.1 %	2.5 %
Sugarbeet	0.5 %	1.2 %	0.8 %	2.9 %	2.4 %	2.8 %	0.0%	1.7 %
Fruits and vegetables	16.9 %	29.8 %	18.6 %	5.6 %	25.0 %	7.1 %	16.2 %	15.8 %

2002-2001 difference:

	Marmara	Aegean	Med	Central Anatolia	Black Sea	East Anatolia	S.E. Anatolia	Turkey Total
Tobacco	-0.3 %	2.5 %	-0.2 %	0.0 %	0.5 %	0.2 %	1.0 %	0.5 %
Wheat	-4.6 %	-9.6 %	2.0 %	2.1 %	-13.8 %	-3.0 %	6.0 %	-2.0 %
Maize	0.2 %	3.1 %	1.7 %	0.4 %	-2.9 %	0.2 %	0.4 %	0.9 %
Barley	-0.9 %	-4.1 %	-3.7 %	1.9 %	-6.2 %	7.5 %	-10.6 %	-3.3 %
Sunflower	13.7 %	-0.6%	-0.1%	1.4 %	0.3 %	-0.2 %	-0.1 %	2.4 %
Sugarbeet	0.0 %	6.7 %	-0.3 %	2.5 %	0.1 %	1.2 %	0.0 %	1.6 %
Fruits and vegetables	-7.5 %	-13.7 %	-2.4 %	3.6 %	32.0 %	-3.0 %	-2.6 %	1.2 %

Crop share=land in crop (ik) / total land (k)
i is crop, and k is region.
Table from Mark Lundell et al. *Review of the Impact of the Reform of Agricultural Sector Subsidization* (2004). However, the authors note that there might be a respondent problem or a sampling problem in the Aegean region, which is being investigated.

One implication of this agricultural restructuring may be a reduction in the capacity of the state to invest in agriculture because of the commitments that it has made to the IMF and the World Bank regarding its removal from the sector. The liberalization program supervised by these institutions foresees that the only way to reduce the increasing budget deficits would be the removal of the state from its social and economic functions. In that sense, in order for the state to pay for its interest payments, the state expenditures aimed at infrastructural investments, agricultural support, and social expenditures are viewed as a heavy weight on the shoulders of the state.

Until 2001, Doğruel et al., notes, Turkish agricultural support policies rested on the direct intervention to input and output prices, and in some cases, the government could enter into markets as the supplier of inputs and buyer of the agricultural products in order to regulate agricultural production and to protect the agricultural producers from market fluctuations and the perverse effects of the natural and climate conditions.[89] However, it should also be noted that, in addition to these direct supports, the indirect support in the agricultural sector by the state included soil and water conservation, agricultural research, education, and extension and training.[90] The interviews I conducted with the public officials in the MARA point to the priority of the government to keep up with the requirements of the liberalization process, thus, the difficulty of convincing high level politicians of the necessity to provide resources for the conservation of plant genetic diversity in a context where reducing state

[89] Doğruel et al.

[90] Ibid.

involvement is considered as the guiding norm. For example, in the implementation of the GEF1 project, the austerity measures imposed by the government constituted a significant obstacle. The project was financed largely by GEF grant monies ($ 5.18 million, versus a domestic contribution equivalent to $ 280,000), yet, the project staff had difficulty in securing the release of funds, especially for the purchase of vehicles and other needed equipment.[91] It should also be added that in the past, when there was a larger state role in the agricultural sector, such support did not exist. Yet, as noted in the above section, the CBD and the related national strategies for the conservation of biological diversity and *in situ* conservation of genetic resources have provided a framework to justify the formulation and implementation of such policies. As such, I will argue that while the aspect of liberalization in the agricultural sector as reflected in the downsizing of the state may not have a direct impact on the erosion of crop genetic resources per se, but will have a negative impact on the state capacity to undertake the policies necessary for its conservation. In addition to the importance of continuing state investment in agricultural research, the capacity of the state to provide incentives or compensate the local communities who engage in practices that conserve genetic diversity is also crucial, which also will be limited by this aspect of liberalization.

[91] "Cutting Edge Conservation Techniques are Tested in the Cradle of Ancient Agriculture: GEF Turkish Project is a Global Model for In Situ Conservation of Wild Crop Relatives" Diversity 16, 4 (2000).

Table 4.8. Estimates of Support to Agriculture (Real 2001 prices-Turkish Lira (TL) billion)

General Services Support Estimate:	1998	1999	2000	2001
Research and Development	36,606	28,525	22,534	36,680
Agricultural Schools	6,532	4, 668	5,277	3,984
Inspection Services	72,789	65,779	72,823	69,490
Infrastructure	9,080	8,130	4,837	4,729
Marketing and Promotion	3,555,339	4,234,190	3,495,033	3,751,569
Public Stockholding	0	0	0	0
Miscellaneous	14,097	9,109	11,346	13,274

Source: Review of the Impact of Reform of Agricultural Sector Subsidization (2004).

Another point that Gökhan Günaydin and Saim Dağ underlined in the interviews was that the push for liberalization in the agricultural sector is leading to concentration of support on particular industrial crops, leaving the production of traditional crops such as wheat and barley namely in the hands of the market where they are not able to compete with world prices.[92] With state support eliminated from such staple crops as wheat, for which Turkey is one of the genetic center and origin of diversity, the implications can be very significant.

[92] Dr. Gökhan Günaydın is the Chairman of Board of the Chamber of Agricultural Engineers. Saim Dağ,is the Vice-president of the Union of Agricultural Chambers.

Table 4.9. Main indicators by commodity-wheat (Billion real 2001 TL)

	Producer support estimate (PSE)	1998	1999	2000	2001
Wheat	PSE (TL bn)	1,575,871	1,254,393	587,792	-157,257
	Percentage PSE	42	42	21	-6
	Producer (net assistance coefficient) NAC	1.72	1.72	1.27	0.94

Source: Review of the Impact of Reform of Agricultural Sector Subsidization (2004).

In terms of how agricultural restructuring discussed above may adversely affect the conservation of crop genetic diversity by the farmers, I will argue that the agricultural price squeeze, as well as the reductions in the producer support estimates for wheat as shown above may have the impact of decreases in the area that of wheat cultivation, and also pressuring wheat farmers to migrate to towns and cities in search for better livelihoods. In fact, as I noted earlier, the results of the ARIP Quantitative Household Survey Data (QHS) show that the share of agricultural land have fallen about 2.0 percentage points (a 4 percent reduction) in 2002 when compared to 2001 in the land sown to grains, mainly wheat and barley. Yet, there are no recent statistics that provide information about the patterns of rural-urban migration.

At the same time, the shift from production based subsidies to the direct income system with no production planning attached to it may in fact have a favorable impact, as the farmers can grow the variety that they wish (traditional or modern), as receiving the DIS is not based on a specific variety, provided that production based subsidies gave incentives to farmers to cultivate the modern varieties instead of traditional ones. At this point, I need to remind the new project I discussed in chapter 3 regarding providing incentives for wheat farmers to cultivate modern varieties of wheat by providing them

certified seed, which accompanies the DIS support. The aim of the project is to increase productivity in wheat output, and runs directly against the cultivation of traditional varieties. As such, this project may limit the possible positive impact of incentive-neutral direct income support.

4.6. Conclusion

This chapter analyzes the linkages between international and national levels through an examination of the implementation of the CBD in Turkey with particular emphasis on *in situ* plant genetic diversity, and the impact of IMF/WB directed policies regarding agricultural liberalization. In terms of biodiversity management, and in particular genetic resources conservation in Turkey, the above analysis shows that while the CBD has contributed to the formulation of policies for biodiversity and genetic resource conservation, the implementation of these policies has been circumscribed by the priorities set by the IMF/ WB directed agricultural policies. The magnitude of the economic crisis that Turkey experienced in 2001, which accelerated the agricultural reform process, has been crucial in the almost unconditional acceptance of the reforms proposed by these institutions.

I argued earlier that the IMF/WB, through the push of agricultural liberalization, will have a negative impact on the national capacity of Turkey to conserve genetic diversity at the domestic level. The current agricultural restructuring supervised by the IMF/WB have pushed the priorities of the Turkish governments toward efficiency and productivity concerns, where environmental protection and conservation of natural resources have remained as secondary. This has made it increasingly difficult for the public officials engaged in the preparation and implementation of plant genetic diversity

conservation an agenda within their agencies, particularly MARA. For example, while I noted above that the CBD provided a significant reference point for project proposals within MARA for the conservation of genetic resources, the extent to which these proposals are going to be accepted and internally funded is questionable because of the different priorities of the MARA. In the national plans for the conservation of biological diversity and *in situ* conservation of genetic diversity, in the preparation of which scientists took active part, the importance of inter-sectoral linkages in the conservation process, for example, the relationship between genetic diversity conservation and agricultural policies, changing agricultural practices, new market demands are emphasized, and a number of priority actions are offered to address the problems. However, the extent of the state capacity to which these linkages can be considered in the context of current agricultural reform process seem highly limited. While the GEF projects provided financial and technical assistance for the conservation of genetic resources, internal resources, such as project investments, have to be mobilized for the policy suggestions indicated in the biodiversity plans in terms of incentive structures as well as capacity building policies for the conservation of genetic diversity to be implemented. As such, I argue that the Turkish experience shows how the priorities of the environmental institution/regime represented by the CBD, as reflected in *in situ* conservation of crop genetic resources, is conceptually nested below the broader priority of market oriented growth, which is expected to increase efficiency and productivity in the agricultural sector. There is a hierarchy of issues in terms of the priorities that are identified, and this may have significant impact on the capacity of the Turkish state to conserve genetic resources within this priority framework.

As noted above, in the national plan for in situ conservation, the main causes of reduction in genetic diversity of landraces are seen in the changing agricultural practices, economic difficulties and new market demands. There is an emphasis that the magnitude of this erosion is not known, and that measures can be taken to conserve the landraces in the field conditions by some socio-economic arrangements. This is precisely where the current restructuring of agricultural policies, and its impact on the capability of farmers to conserve crop genetic diversity come to the forefront. At this point, it is the behavior of farmers who continue to cultivate traditional varieties of crops that is targeted for in situ conservation of crop genetic diversity, which is embedded in the broader policy context where the priority is aimed at increasing the efficiency and productivity by making the market process determine the production. I had noted in chapter 2 that one crucial question was how to reconcile this paradox, that is, whether it is possible to link economic efficiency concerns with the conservation of genetic resources.

The analysis of the conservation of crop genetic diversity by the farmers at the local level in the previous chapter shows that there is not necessarily an inevitable trade off between cultivation of traditional varieties and modern varieties, as many of the farmers who still cultivate traditional varieties have underlined they cultivate these along with the modern varieties. The farmers produce a positive externality by the cultivation of landraces, in view of long term contribution to the world's crop genetic diversity, which is crucial for global food security and has an intergenerational aspect. Yet, the notion of efficiency as embraced by the current IMF/WB does not take into account this positive externality produced by the farmers. A broader notion of

efficiency that internalizes this positive externality, namely, the value of this public good, crop genetic diversity, can be extremely important in the long-term conservation of genetic resources. In terms of reconciling the paradox noted above, one question is whether it is possible for the IMF and the World Bank to take on this broader notion of efficiency, and be reflected in national agricultural policies, which will have significant policy implications for the conservation of crop genetic resources.

To conclude, the question is how to change the politics so that a form of policy management that will provide the conservation of biodiversity and crop genetic resources can be embraced? In Turkey, I argued that the CBD has been significant in strengthening of non-governmental domestic actors, and that this had implications (though as yet, very limited) for the local participation for the conservation of crop genetic resources, given the recognition of the importance of the NGOs in local conservation efforts. This was crystallized during the GEF 1 project implementation. This process of local participation is inextricably linked to the social capital, both efforts particularly to build social capital from "outside in" (the synergy approach), as well as the networks view which emphasizes the sources of social capital (i.e. practices of reciprocity) within the farmers' communities at the local level in Turkey for the conservation of traditional varieties.

Yet, as I noted in chapter 3, the possibility of formulating and implementing policies in accordance with the synergy approach to social capital is dependent on the extent to which public officials (agricultural researchers and local officials) recognize the existing patterns of relationships in the communities, the value and importance of the traditional varieties to the farmers who still cultivate them, and their knowledge

about the agricultural processes of cultivating these traditional varieties. This process necessitates the diffusion of the idea of the significance of in situ conservation of traditional varieties among the central agricultural bureaucracies, and from them to the local agricultural officials. There is no inherent contradiction between the conservation of crop genetic resources and promoting agricultural growth and productivity.

CHAPTER 5

CONCLUSION: THE CONSERVATION OF CROP GENETIC DIVERSITY IN TURKEY: POLICY IMPLICATIONS

5.1. Introduction

The conservation of crop genetic resources is an issue that well represents the linkages between different levels of social organization, local, national and international. While some international institution/regimes, such as the CBD, provide opportunities at the national and local level for the conservation of crop genetic resources, these are interconnected with the international neoliberal institution/regime embodied by the international financial institutions that affect national agricultural policies. As such, the local conservation of crop genetic diversity by the farmers is embedded in their intersection.

The local and global benefits of biodiversity conservation involve, Perrings and Gadgil note, public goods, and most importantly, the global public good –the information contained in the gene pool.[1] Through the cultivation of landraces, the farmers produce a positive externality by creating crop genetic diversity, which is crucial for global food security and has an intergenerational aspect. As such, the local conservation of crop genetic resources has significant global implications.

---

[1] Charles Perrings and Madhav Gadgil, "Conserving Biodiversity: Reconciling Local and Global Public Benefits," in Providing Global Public Goods: Managing Globalization, Inge Kaul, Pedro Conceicao, Katell Le Goulven, Ronald U. Mendoza, eds. (New York: Published for the United Nations Development Programme [by] Oxford University Press, 2003), 532-555.

5.2. Conservation of Crop Genetic Diversity by the Farmers at the Local Level

In Chapter 2, I noted that farmers are embedded in a set of social relations within their communities and the production of landraces occurs in the context of a locally shared knowledge of crops and exchange of seeds. The networks approach to social capital would propose that these components of social capital, the exchange of seeds, the shared knowledge at the community level and tastes and preferences enable the farmers to continue practices that maintain crop genetic diversity. Yet, agricultural restructuring with greater emphasis on markets and efficiency may result in the decrease of cultivation of traditional varieties, replaced by modern, high yielding varieties. Under increasing pressure for market production, farmers may convert to modern varieties. In his discussion of agrobiodiversity conservation, Douglas Bardsley argues that numerous agricultural systems are unlikely to survive within a state of unregulated market forces, since more efficient systems will have competitive advantages, and marginalized farmers are likely to be further alienated from the benefits of development and forced to erode local environments as they aim to maximize their production levels in the short term.[2] In this context, based on the synergy approach to social capital, one proposition is that in the conservation of crop genetic diversity, public agencies can be extremely important in the provision of mechanisms that will ensure that the cultivation of landraces will meet the needs of the rural communities.

---

[2] Douglas Bardsley "Risk Alleviation via In Situ Agrobiodiversity conservation: drawing from experiences in Switzerland, Turkey and Nepal," Agriculture, Ecosystems and Environment 99 (2003): 149-157.

The field work that I conducted in Balıkesir and Eskişehir in the Western region of Turkey with wheat farmers reveals various results. First, it is important to understand what factors the farmers themselves identify for continuing to cultivate traditional varieties or abandon them. In both provinces, in the villages located in the valley and those close to the markets, farmers have abandoned the traditional varieties a long time ago, and cultivate the modern varieties of wheat in their field. In the mountain and hillside villages, there are still farmers who cultivate the traditional varieties, usually along with modern varieties. As the most important reason for cultivating the modern varieties, the farmers indicate yield, which is superior when compared to the traditional varieties. This is particularly important as the farmers are willing to sell their product after they preserve the amount necessary for their own consumption. The farmers who still cultivate the traditional varieties note their suitability to the soil and environment, and view them as an insurance against possible losses from the modern varieties, since the traditional varieties will give a more or less stable yield even in the worst conditions. It is for the most part elderly farmers who still cultivate the traditional varieties, and the quality and taste of these varieties are the factors that are frequently cited by those farmers for the continuation of their cultivation. Also, the elderly farmers who possess the most knowledge about the traditional variety, and sometimes who introduced a variety to the village by experimenting through selection and combination of different wild and existing domesticated traditional varieties are widely respected by the other farmers, and referred to as the 'real farmers' in a community. There is an ongoing exchange of seeds at the community level, with neighbors and other farmers in the village, who would have the good seed from previous years. As such, landrace

cultivation is not just a matter of individual incentives, but also of social capital, for example, the local knowledge is not held just by individual farmers but is shared with one another, as farmers benefit from each other's knowledge. The exchange of seeds among the farmers occurs based on principles of trust and reciprocity.

However, a significant number of farmers who cultivate the traditional varieties have started cultivating the modern varieties in recent years, in some cases 2-5 years ago. These farmers have indicated that yield concerns have pushed them to try to cultivate the modern varieties, even when their field is not very fertile and they know that they will not get the same results as they would have had their fields been in the valley. Even though for the most part these farmers cultivate wheat for their own consumption, it is almost always preferable to have some wheat that they can sell in the market, which demands particular modern varieties.

Even though official statistics do not show a decrease in the amount of land for wheat cultivation in both provinces, some of the farmers interviewed said that they had reduced in the past years the land on which they are cultivating wheat. As for the impact of changes in the agricultural policy, the farmers have noted that the elimination of subsidies have resulted in their inability to buy the necessary inputs for production, yet, interestingly, this has not caused them to revert to the cultivation of traditional varieties instead of the modern. They continue to cultivate the modern varieties with seeds that they preserved from the previous years, as long as they perceive that these varieties will give higher yields even if it is not the new seed. In the mountain and hillside villages, most frequently, the farmers either cultivate the modern varieties or both traditional and modern varieties. There are few farmers who cultivate only the traditional variety, and

these are almost always elderly farmers who are most adamant and view the traditional variety as the most suitable for their field and would not revert to the modern varieties.

In this context, I argued in Chapter 3 that while the components of social capital based on the networks view, the exchange of seeds, taste and preferences with regard to flour and cooking quality of the traditional variety, and the sharing of knowledge by the elderly 'real farmers' can be important in the continuation of landraces practices, there is increasing pressure for raising yield either to have enough food to consume at home, but more importantly, to sell the surplus produce in the market in order to earn some extra cash. Also, in terms of the transmission of taste and preferences to the younger generations, there is problem regarding the cultivation of traditional varieties, a sign of erosion of this component of social capital. As such, I argued that based on the synergy approach to social capital, an effective coproduction strategy, which will bring farmers' communities and government officials together can be extremely important in the maintenance of the practice of cultivation of traditional varieties. In this context, the question is how to build and maintain the social capital in order to sustain the components of institutional fabric that leads to the continuation of cultivation of landraces. The effectiveness of these policies in the Turkish context will depend on the extent to which public officials (agricultural researchers and local officials) will recognize the existing patterns of relationships in the communities, the value and importance of the traditional varieties to the farmers who still cultivate them, and their knowledge about the agricultural processes of cultivating traditional varieties.

The liberal-productivist model, Douglas Bardsley notes, calls for greater market liberalization and rationalization of methods of production and trade to improve

efficiencies as well as to maximize economic returns for agricultural activities. He argues that the ongoing neoclassical approach to globalization neglects the margins and enhances risks associated with agriculture, yet, an alternative human ecology paradigm could focus on issues of socio-ecological sustainability within the periphery by ensuring that development supports local diversity. The findings of the field work in Turkey suggest that some farmers still cultivate the traditional varieties in order to ensure to have some food in case of modern varieties' failure, as well as preferring to have that particular variety for reasons of taste and quality. At the same time, there is strong evidence that there is not an inevitable trade-off between the cultivation of traditional varieties and modern varieties, many farmers cultivate both at the same time, because of the possibility allowed by the fact that their fields are located in different parts. These farmers know which variety is suitable for which part of their field. These findings suggest that despite common view that the farmers who still cultivate the traditional varieties are backward, resistant to change, and the major cause of inefficiency of wheat production in Turkey, the farmers in fact know about the new varieties but continue for the reasons cited above.

As such, how can we locate these local level agricultural practices in the context of national and international level factors with regard to conservation of genetic resources? As I noted previously, the Convention on Biological Diversity emphasizes the importance of *in situ* conservation of genetic resources, while the IMF and the World Bank aim at the provision of macroeconomic stability through arrangements in various sectors of national economies, including the agricultural sector. I will now

return to the implementation of the CBD in Turkey and its overlap with the agricultural restructuring directed by the IMF/WB.

5.3. Conservation of Genetic Resources in Turkey and Agricultural Policies

In Chapter 2, I offered different theoretical explanations in the International Relations literature in terms of the influence of international institutions/regimes on state behavior, with particular reference to implementation of and compliance to international obligations embodied by institutions/regimes. Below, I discuss the implementation of the CBD with reference to the different theoretical approaches in International Relation theory, and the interplay between the CBD and the IMF/WB directed policies in Turkey in the context of genetic resource conservation.

At the stage of implementation, according to the realist approach, the existence of a hegemon or dominant states will influence whether or not Turkey will implement the CBD obligations at the national level. This approach would assume that the international environmental institution/regime in question reflects the interests of the hegemon who will push for its implementation and compliance. As such, one would expect that the norms of the CBD should reflect the interests of the hegemon or powerful states who negotiated the Convention, and if this is not the case, then the norms, principles and rules of the CBD will hardly be reflected in practical political action. As Rosendal notes, the normative orientation of the CBD with the recognition of the sovereign rights of states over the genetic resources that are within their territory, as well as the emphasis on equitable sharing of the benefits arising out of the utilization of these resources was the breakthrough of developing countries, reflecting the position of gene-rich developing countries in the South. This was the major reason why the United

States did not ratify the Convention, even though it was one of the pioneers initially for the formulation of a convention on biological diversity. As Rosendal underlines, some regimes may have strong normative influence, a higher degree of legitimacy even in the absence of powerful states pushing for the implementation of stronger compliance mechanisms.

However, at the same time, one could argue that the financial mechanism of the CBD, the GEF is under the influence of the developed countries, and as such, it provides an instrument for the realization of developed country interests and these will be reflected in the implementation of the CBD. The implementing agencies of the GEF are the World Bank, the UNDP and UNEP, with the World Bank assuming the most responsibility. I noted earlier that there were significant North-South divisions in the operation and structure of the GEF3, and there was a strong resistance from the developing countries to make the GEF the permanent financial mechanism of the CBD. Initially, the GEF's informal consensus-based governance arrangements used neither Bretton Woods (contribution-weighted votes) not UN (one-nation, one vote) rules, avoiding immediate conflict over allocation of decision making authority. However, this informal structure began to break down as GEF became more closely linked to UN-based conventions.4 In the restructuring negotiations of the GEF, Fairman underscores that the allocation of voting power among developed and developing countries became the final sticking point, and the agreement in 1994 established a GEF council with

---

[3] David Fairman, "The Global Environmental Facility: Haunted by the Shadow of the Future," in Institutions for Environmental Aid: Pitfalls and Promise, Robert O. Keohane and Marc A. Levy eds. (Cambridge, MA.: The MIT Press, 1996), 55-87.

[4] Ibid.

fourteen developed country members, sixteen developing country members, two members from countries in Central and Eastern Europe and the former Soviet Union. Each of these blocs would decide how to select its representatives, and when there was no consensus on an issue, an approval of a proposal would require a 60 percent majority of donation-weighted votes and a 60 percent majority of countries represented. The GEF's focus on global commons problems, and its incremental cost finance strategy, Fairman argues, satisfied a number of core interests of its most important stakeholders, though not resolving important underlying disagreements. Yet, importantly, it allowed the World Bank to distinguish the GEF from its other lending windows. As such, while the GEF is an IFI, it is significantly different from other IFIs, including the IMF and the World Bank, in its voting procedures as well as its focus.

Neoliberal institutionalism would predict that a state will implement the CBD in accordance with its cost-benefit calculations based on the incentives provided by the CBD, focusing on largely material incentives, for example, through financial transfers and technical capacity building activities at the national level. Constructivism, on the other hand, would predict at the implementation stage that the epistemic communities, in a path dependent way in line with framing decisions, will play a role in diffusing CBD norms and policy innovations with regard to conservation of biological diversity in general and genetic diversity in particular.

With regard to the linkages between international and national level factors in the conservation of agricultural biological diversity, the dissertation first looked at the implementation of the CBD, focusing on the conservation of genetic diversity in Turkey. With reference to how causal pathways link the factors at the international and

national level in the implementation of international environmental agreements, I discussed Rosendal's four institutional mechanisms, namely, the moral, material, mutual reassurance and empowerment.[5]

Some of the conclusions from the analysis of the biodiversity policies in Turkey can be summarized as follows. While a structure for *ex situ* conservation genetic resources in Turkey existed well before it became a party to the CBD, the national focus on *in situ* conservation started in the beginning of 1990s, after Turkey signed the CBD. FAO was instrumental in the provision of the existing infrastructure for *ex situ* conservation. The signing of the CBD in the Turkish context provided and expanded the space and institutionalized channels for scientific input to be integrated to the policymaking process. These two channels have been identified as occupying advisory positions in the discussions and the preparation of plans for the conservation of biological diversity in the related ministries and the SPO, and scientists may take the leadership of scientific projects that are being sponsored by state agencies. In this way, it can be argued that the CBD enabled and strengthened the position of these actors to participate and have an impact on the policy making process.

---

[5] As noted in Chapter 2, moral mechanism refers to the scope for willingness to implement, that is, the content of the agreement may be perceived as legitimate in itself, or an agreed international norm may be perceived as an obligation. As such, at the national level, the assumption is that this mechanism will affect commitment, as well as state capacity (indirectly) to formulate and enforce environmental policies. The material mechanism on the other hand focuses on how the agreement may affect domestic cost and benefit calculations relating to implementation. Mutual reassurance focuses on the role of information, monitoring and sanctions in reducing uncertainties about free riders among the participants in the agreement in the implementation process. Lastly, the empowerment mechanism Rosendal proposes refers to how an international regime may encourage alliances between international and nongovernmental domestic actors, inducing far reaching domestic implementation of regime objectives at the national level, the most important actors in this mechanism are epistemic communities.

Institutions can foster capacity building at the national level by providing policy relevant knowledge in a form that is readily usable.[6] Capacity building induced by institutions may go beyond the technical assistance, but also foster the provision of a public commitment to a set of norms and principles. This can be used by domestic proponents of adjustment measures in their attempts to overcome their opponents in funding and turf battles.[7] International environmental institutions are also vehicles for transferring skills and expertise and for empowering domestic actors who are motivated to solve domestic problems of international significance. In the case of the CBD, through the projects financed by the GEF, not only technical capacity building for the *in situ* conservation of genetic resources was provided, but also the importance of *in situ* conservation through the establishment of gene management zones as a policy innovation was put on the agenda. The idea of providing active management in targeted conservation areas revealed the inadequacy of measures declaring an area as a protected site as characterized by earlier conservation measures (i.e. national parks). The CBD also provided the public officials in the GDAR of the MARA an important mechanism for legitimizing the proposal of projects to the government for the conservation of genetic resources. In these project proposals, as one MARA official noted, the reference to CBD and the obligation of Turkey as a party to it to conserve its genetic resources is frequently used as a justification.

---

[6] Peter M. Haas, Robert O. Keohane and Marc A. Levy, eds. Institutions for the Earth: Sources of Effective International Environmental Protection, (Cambridge, Mass.: The MIT Press, 1993).

[7] Ibid.

The GEF pilot project was instrumental in the preparation of the National Plan for *In Situ* Conservation of Plant Genetic Diversity, which provides the basic framework for *in situ* conservation activities. A draft copy of the National Plan was prepared in 1995, and its copies were sent to involving institutions within the country to get the views of experts. Also, it was presented in the International Symposium held on "*In Situ* Conservation of Plant Genetic Diversity" in 1996, Turkey, in order to solicit the views of international experts on the draft. The comment and criticisms by national and international experts were integrated into the present version of the National Plan. The GEF project was very significant in terms of providing technical assistance and building national capacity. However, the concrete implementation of the policies and strategies embraced by the National Plan is very limited. In terms of the positive linkages among institutions in the area of conservation of plant genetic resources, the FAO, the CBD, and the GEF as the financial mechanism designated for the implementation of the CBD have reinforced each other in terms of the ability of the Turkish state to formulate policies for the conservation of plant genetic resources at the national level. The FAO was not only instrumental in the establishment of the infrastructure for *ex situ* conservation, at the same time, national reports were prepared for the FAO regarding the status of plant genetic diversity for food and agriculture, the causes of genetic erosion and policy suggestions for the conservation of genetic resources.

The role of the NGOs in the process needs to be underlined. In the initial stages, one NGO in Ankara has played an instrumental role in bringing together Turkish scientists and public officials in meetings on the conservation of biological diversity and genetic resources toward the end of 1980s, and publishing books. However, the

government recognition of the crucial role that NGOs could play in conservation measures came only after the signing of the CBD and the GEF project implementation, where the government realized particularly in terms of establishing contact with local communities in conservation practices, the NGOs can be very important. A number of NGOs also collaborate with scientists particularly in examining and identifying the conditions for conservation in biodiversity rich areas.

The role of ideas embedded in institutions, shaping perceptions and decisions taken under their auspices and conditioning practical policy choices by actors can be crucial.[8] The interviews that I have conducted with government officials in the MOE, MARA, MOF, State Planning Organization (SPO), and the Turkish Patent Institute (TPI) point to the general agreement on the normative basis of the CBD regarding the recognition of national sovereignty over genetic resources as well as equitable sharing of the benefits. Almost 100 % of the government officials interviewed share this view. However, the formulation and implementation of international agreements do not occur in a vacuum, a regulatory space, already occupied by a set of problem definitions and constellations of supporting and opposing societal and bureaucratic forces provide the context into which these agreements enter.[9] While there is an agreement on the basic norms of the Convention, the priority areas that each government agency suggests in order to achieve the objectives of the CBD may differ because of the different mandates

---

[8] Peter M. Haas, "The Future of International Environmental Governance," Global Peace and Conflict Studies at UC Irvine (Working Paper 96-1, 1996).

[9] Kenneth Hanf and Arild Underdal, International Environmental Agreements and Domestic Politics: The Case of Acid Rain (London: Ashgate Studies in Environmental Policy and Practice, 2000).

of the ministries and the problematic overlap of responsibilities. The legal framework pertaining to the conservation of biological diversity also reflects this complexity.

Another problem that needs to be underscored is that in the interviews, the scientists often referred to the difficulty of communicating with public agencies and establishing long term partnerships because of the frequent changes and relocations of the personnel in the ministries, which points to the lack of institutionalization in the public bureaucracies. This at the same time provides important obstacles to the continuity of policies. As one scientist pointed out, despite taking part in the formulation of national plans for biological diversity, there is a skepticism that the government will actually mobilize resources and implement the plans and programs that are being prepared because of the reasons described above.

In the summer of 2003, with participation of public officials and scientists, the MARA organized a meeting in order to evaluate the views and suggestions for the effective conservation, use and the evaluation of the economic value of national genetic resources.[10] In this meeting, one suggestion was the establishment of a Center for the coordination of the efforts for the conservation of genetic resources. However, there were diverging views as to the structure of the Center. One suggestion was to establish the Center within the AARI, MARA because of its existing infrastructural powers. Another suggestion was to establish the Center as a semi-autonomous agency related to the Prime Ministry to preserve its scientific status and prevent the infiltration of political pressures. If the center is designed within the context of the ministries, there

[10] The meeting was initiated by the General Directorate for Agricultural Research (GDAR) of the MARA, and was hosted by AARI.

might be problems regarding the continuity of policies. It was underlined that the structuring of the Center had to be in congruence with the CBD, and in an organic relationship.[11]

I noted earlier that in terms of the implementation of the CBD in Turkey, the realist approach would hypothesize that Turkey would implement the obligations stemming from the CBD if and when a dominant state or states compelled it to do so via sanctions or rewards. The analysis presented in chapter 4 of the implementation process that is taking place in Turkey shows no evidence of a dominant state that has forced Turkey to implement the CBD. One could proceed with the argument that the GEF is under the influence of the developed countries, and as such, it provides an instrument for the realization of developed countries' interests. Yet, as noted above, the GEF has a complex decision making mechanism which differentiates it from the IFIs such as IMF and the World Bank where contribution weighted votes are the arrangement. Also, the interviews with public officials in Turkey reveal that while it is viewed as important assistance instrument, there is hardly an unconditional acceptance of the GEF projects. The neoliberal institutionalist approach, on the other hand, would predict that a party to the CBD would implement the CBD to the extent these implementation activities serve the (a priori) defined interests of the party in consideration. This approach embraces the

[11] Summary of the views and suggestions on the system for the effective conservation of genetic resources and biological diversity and their economic value. The participants made the following conclusion: That there was a lack of integration regarding the work on biological diversity in Turkey, and a mechanism will provide the coordination and the integration of this work is necessary. Another decision taken was that the execution of the national genetic resources research and development project has to continue, and there will be a Project Executive Committee (comprised of five members of the MARA, five scientists from universities, two from Ministry of Environment and Forestry, two from SPO, one member from TUBITAK, and NGO representation).

importance of material and mutual reassurance mechanisms as identified by Rosendal. The constructivist approach would predict that a party would engage in implementation activities as a consequence of the process of learning through the diffusion of norms and policy innovations adopted by the CBD, even in the absence of sanctions. This approach addresses the importance of both moral and empowerment mechanisms that Rosendal proposes. At this point, the process of normative persuasion and augmenting the power of the domestic actors who advocate conservation activities is very important. In accordance with this approach, I noted earlier that the international institution/regime embodied by the CBD can be crucial in terms of providing the space for those domestic actors to incorporate their input into the policy making process for conservation of genetic resources. This will induce learning about connections between issues and the acceptance of new policy maps.

In terms of conservation activities in Turkey, the CBD played a crucial role in the acceptance of the importance of the idea of *in situ* conservation of genetic resources through the establishment of gene management zones (GMZs) as a policy innovation. While there was a claim that *in situ* activities started with the designation of national parks by the Ministry of Forestry some forty years ago, the idea of active management through surveys and monitoring, analyzing the threats that these zones face and undertaking necessary measures to prevent genetic erosion is a policy innovation which came in the process of the implementation of the GEF 1 project. The project culminated in the national plan for *in situ* conservation. During the preparation of the plan, scientists and public officials responsible from implementation activities came together.

This provided the space for the scientists to integrate directly their input to the policy process, underscore the linkages between different sectors for the conservation of genetic resources, as well as train the public officials for *in situ* conservation. Yet, the project did not only provide financial resources and technical infrastructure for the conservation of genetic resources. It was particularly crucial in terms of offering channels for the scientists who had been working on biodiversity conservation, as well as NGOs to participate in the formulation and implementation of conservation activities in the context of *in situ* conservation of wild relatives of crops and tree species.

The preparation of the National Biodiversity Action Plan was also an important process for the incorporation of scientific input and induce learning by government officials of the significance of conservation of biological diversity, not simply *ex situ* (which had previously been part of national policy) but *in situ*. In this sense, the process of preparation of both plans and the implementation of the GEF project increased the national capacity of Turkey to conserve genetic diversity. This process, partly, could be linked to the material mechanism as linked to the neoliberal institutionalist approach, as the GEF provided financial resources for the project. Yet, more importantly, I argue that the moral and empowerment mechanisms in relation to the constructivist approach were crucial in terms of legitimizing the norms and policy innovations in relation to the CBD and strengthening position of the scientists and NGOs. The reference to CBD and the obligation of Turkey as a party to the Convention to conserve its genetic resources is frequently used as the justification for project proposals for the conservation of genetic diversity within the MARA. I will argue that in terms of biodiversity conservation, as

the constructivist approach would predict, the CBD in Turkey had a positive impact through the diffusion of norms and policy innovations.

However, while there was a focus on the conservation of wild relatives of crops and tree species, landraces were not included in the project, the reason proposed as *in situ* conservation of landraces is very complex, involving biological, social and policy issues, and that this would test the limits of a pilot project. In the national plan for *in situ* conservation, the main causes of reduction in genetic diversity of landraces are seen in the changing agricultural practices, economic difficulties and new market demands. There is an emphasis that the magnitude of this erosion is not known, and that measures can be taken to conserve the landraces in the field conditions by some socio-economic arrangements. As noted in chapter 4, this is precisely where the current restructuring of agricultural policies, and its impact on the capability of farmers to conserve crop genetic diversity come to the forefront. At this point, it is the behavior of farmers who continue to cultivate traditional varieties of crops that is targeted for *in situ* conservation of crop genetic diversity, which is embedded in the broader policy context where the priority is aimed at increasing the efficiency and productivity by making the market process determine the production. As Berkes notes, development policies are often carried out through the centralization of decisions and increased participation in market economies, as well as the application of inappropriate pricing, subsidies, legislation and governmental incentives.[12] As such, capacity building at the national level is not adequate if the aim is to conserve crop genetic diversity at the local level. Capacity

[12] Fikret Berkes, "Cross Scale Institutional Linkages: Perspectives from the Bottom Up" Paper prepared for NAS/NRC Panel on Institutions for Managing the Commons, 2000.

building measures must be based on a comprehensive view that emphasizes the importance of institutional arrangements, appropriate government policies, and stakeholder participation.

Qualset et al., citing Brush, note that there is unrelenting change in human populations with respect to social habits, economic incentives, reception of technology and response to government policies.[13] In terms of crop plant conservation, these changes have affected the inventory of crops being managed, and the genetic composition of agricultural species. They underline that in the years of the Green Revolution, adoption of modern varieties was rapid and independent of the farm size. More recently, however, the small scale farmers have been slower to adopt the newer modern varieties than those with large holdings. In a discussion of the incentives to farmers and communities for the conservation of genetic resources, they argue that the removal of perverse incentives, such as giving credit for only the cultivation of modern varieties should be emphasized, and note that for political or social reasons, governments often institute incentives that induce behavior in the community which will deplete biodiversity.

In the case of wheat production in Turkey, which is the focus of this dissertation, there has been a significant change in the policies implemented. Government has long intervened in the wheat sector in order to ensure food security for the population, and stable income to its farmers, yet, like many developing countries, Turkey has embarked

---

[13] Calvin O. Qualset, Ardeshir B. Damania, Ana Christina A. Zanatta, and Stephen B. Brush, "Locally based Crop Plant Conservation," in Plant Genetic Conservation: The In Situ Approach, Nigel Maxted, Brian Ford-Lloyd, and John Gregory Hawkes, eds. (London; New York: Chapman & Hall, 1997): 160-175.

on a process of market liberalization. As noted in chapter 4, support price for wheat in 2000 was linked to world reference, and set at a level which reduced the premium over the world price to approximately 35 percent. Grain (wheat, barley and maize) prices in real terms declined by about 5 to 10 percent because of reduced government intervention. Wheat import tariffs were also reduced substantially. According to the results of the ARIP Quantitative Household Survey Data (QHS) that was conducted in November-December 2002, in terms of the land sown to grains, mainly wheat and barley, the share of agricultural land has fallen about 2.0 percentage points (a 4 percent reduction) in 2002 when compared to 2001.

Aydın argues that in Turkey, subsidies enhanced the welfare of the poor in general and of small producers in particular, and that their reduction and total elimination have ruinous effects on small and marginal producers.[14] He notes that increased prices of inputs as a result of reduced subsidies mean loss of entitlement to food as more and more small farmers are forced out of agriculture. In terms of migration from rural areas to the urban, there are different arguments. Yakin Ertürk, writing in 1999, poses the question of why the level of rural-urban migration has been much lower than its potential. She argues that the sustenance of nearly 40 % of the population on fragmented and unproductive production units on land is made possible by a strategy that involves the diversification of household resource base by

---

[14] Zülküf Aydın, "The New Right, Structural Adjustment, and Turkish Agriculture" The European Journal of Development Research 14, 2 (2002): 183-208.

restructuring of their division of labor.[15] Small-holders, she underlines, could thereby maintain their status as independent family cultivators on their land while integrating into the non-subsistence, non-agricultural, and non-rural sector, creating a land-based/free floating labor-force. Internal migration rates reached a peak of 10.7 % in 1970, but the following years showed a decline, dropping to 9.9 % in 1975, to 7 % in 1980, 6.5 % in 1985, but again increased to 8 % in 1990.[16] Ertürk argues that instead of permanent migration, seasonal/temporary population movements have become the mode of survival. On the other hand, Oyan argues that the recent agricultural restructuring, with the liquidation of support mechanisms concerning product and input prices, sectoral credits, breeding stock and seed production will mean destruction not only for the Turkish farmer, but also for the self sufficiency in agricultural production and food security of the country as a whole and that the ensuing new wave of migration will inevitably cause an upheaval in the social tissue.[17] He notes that this process of liquidation, which will compel the masses of peasants to move out of agriculture will possibly double the rate of rural-urban migration.

How can we link these developments to the conservation of crop genetic diversity by the farmers at the local level in Turkey? In terms of the processes by which

---

[15] Yakin Ertürk, "Research on Rural Communities in Turkey" in Science and Research Policy in Turkish Agriculture, Ahmet Bayaner and Bozkurt eds. (Ankara; Agricultural Economics Research Institute (AERI) Publications, 1999).

[16] Ertürk notes that though this must be further investigated, this increase might be due to the population displacement caused by factors related to terrorism in Eastern and Southeastern regions of the country.

[17] Oguz Oyan, "From Agricultural Policies to an Agriculture without Policies" in Ravages of Neoliberalism: Economy, Society, and Gender in Turkey, Nese Balkan and Sungur Savran eds. (New York: Nova Science Publishers, 2002).

losses of crop genetic diversity may occur, first, farmers may decide to convert to the modern varieties of the same crop that they used to plant, second, farmers can convert to new crops, and lastly, they may abandon farming altogether for non-agricultural occupations. I argued earlier that while the CBD increased state capacity to conserve genetic resources, the agricultural restructuring reduced the capacity of the state to support crop genetic diversity. As noted earlier, being a party to the CBD, and project implementation measures have augmented the power of domestic groups such as scientists and NGOs in favor of conservation of genetic resources, as well as groups within the public agencies particularly in the General Directorate of Agricultural Research of the MARA, who are in charge of the projects in relation to conservation of genetic resources. Yet, the downsizing of the state in the agricultural sector, coupled with the priority of increasing efficiency, have limited the power of these groups to persuade higher level politicians for the necessity of *in situ* conservation of these resources. In this context, it is highly unlikely to expect that the state will undertake projects that will support the farmers in regions of diversity to cultivate the traditional varieties for the conservation of crop genetic resources, even though it is underlined in the Agricultural Research Master Plan that the *in situ* conservation of wild relatives of crops, as well as landraces cultivated by farmers is crucial and that policy measures need to be implemented. It should be noted that such state support did not exist previously when there was a larger state role in agriculture. Yet, the CBD provided the context within which such support could be legitimized. As such, the downsizing of the

state will have the impact of not being able to take measures to conserve crop genetic diversity, rather than a direct impact on genetic erosion.

For example, as noted in chapter 4, a new project will provide incentives for wheat farmers to cultivate modern varieties of wheat by providing them certified seed. The project will make use of the direct income system's farmer registration program and identify those farmers who can act as models for other farmers and provide advise to them in using these new varieties. The government describes the aim of the project as increasing yield, as well as the quality of the wheat being produced. Wheat farmers who sell their produce directly to the merchants or in the grain stock market will receive a certified seed premium per kg of the wheat that they have sold. The seeds will be provided by the MARA's breeding institution and the private seed companies who participate in the project. This internally funded project is part of the Turkish government's attempt to increase productivity in wheat production, and runs directly against the cultivation of traditional wheat varieties.

The interviews with farmers in Balıkesir and Eskişehir suggest that there is a shift from the traditional varieties to the modern varieties of wheat, a number of farmers telling that they have done this in past of couple of years due to concerns of yield. These farmers had access to modern varieties long before, but yield concerns in recent years have pushed them to try the modern varieties. Many of the farmers have indicated that they receive the direct income, which is the current available support. The use of this direct income have been to pay the debt that the farmers owed previously, for non-agricultural purposes, such as education of the children etc, and to some extent, buying inputs such as fertilizers and modern varieties of seeds. The farmers complain of the

increasing difficulty of maintaining their livelihoods in current conditions, and many households have at least one member of the family who resides outside and is working in a non-agricultural occupation, and other members are seeking daily occupation in nearby towns or wealthier villages. A significant number of farmers who cultivate both varieties noted that yield is very important, for they can not produce enough only by cultivating traditional varieties even for their own consumption, and better is if they have some surplus so that they can sell in the market in order to earn some income. Particularly younger farmers are oriented towards cultivating the modern varieties, which was also a point underlined by many elderly farmers. Direct income is welcomed by many farmers as it provides cash. However, based on the ARIP-QHS data set, the authors found that those households with greater relative wheat specialization, tobacco specialization and barley specialization all experience a significantly negative impact on agricultural income[18], which is parallel to the perception of the farmers I interviewed about the difficulties in maintaining their livelihoods.

In terms of rural-urban migration, the farmers noted that there had been a significant wave of migration in the past, yet, in the last two years, this had stopped because the cities no longer provided job opportunities with the economic crisis in 2001. However, the younger farmers are thinking about migrating when they think that there will be better living conditions in the city. This was also underlined by the older farmers that the younger generation is not attached to the village as they themselves are,

---

[18] Mark Lundell, Julian Lampietti, Rashid Pertev, Lorenz Pohlmeier, Halis Akder, Ebru Ocek, and Shreyasi Jha, "Turkey: A Review of the Impact of the Reform of Agricultural Sector Subsidization," Environmentally and Socially Sustainable Development Unit Europe and Central Asia Region (The World Bank, 2004).

and are inclined to move to either the towns close to the village or the city when they can. This can have important implications for the continuation of agricultural production. Again, the main reason is the difficulty of sustaining their livelihoods in adverse conditions in the village. However, in current conditions of unemployment in the cities, the village is perceived to be the only option to the younger generation, who are better educated than their parents.

5.4. Policy Implications

As such, one crucial question is what are the policy implications in Turkey for the conservation of crop genetic diversity by the farmers at the local level? There are a number of policy options that have been suggested by authors working on the conservation of crop genetic diversity. In the context described above, I argue that based on the synergy approach to social capital, the provision of mechanisms that will enable the farmers to sustain their livelihoods while cultivating traditional varieties, as well as elimination of policies that induce the abandonment of traditional varieties in favor of modern ones can be extremely important. At the same time, as the literature on social capital emphasizes, the issue is not merely providing individual incentives to farmers. Since, the production of landraces, as revealed in the Turkish context, has a social component in it, with the exchange of seeds, shared knowledge about traditional varieties, and shared preferences about taste and quality. In this sense, rewarding the communities where cultivation of landraces still continues should be an important policy agenda.

There has to be the recognition by the state in central agencies, as well as local agricultural offices of the importance of conserving crop genetic diversity by the

farmers, rather than viewing them as the cause of inefficiencies in agricultural production, in particular wheat. The main orientation of the local public officials is the use of modern varieties to increase yields, parallel to the central priority of the MARA, based on the policy of increasing agricultural productivity. For example, the existence of informal mechanisms of exchange of seeds among the farmers of both traditional and modern varieties (which is based on the notion of reciprocity in the villages) is viewed by the MARA as one of the factors that lead to decreasing productivity in agriculture. As underlined above, a project on the distribution of certified seeds is going to be implemented. Rather than targeting their abandonment, the policies should build on those social practices that enable the continuation of cultivation of landraces for the conservation of genetic resources.

5.4.1. Providing Rewards for Conservation of Crop Genetic Diversity

While the farmers' concern for yield is very important, particularly the elderly farmers' preferences for the traditional variety for reasons of taste, quality, and adaptability to environmental conditions are significant factors in the conservation of genetic diversity. For example, as noted in chapter 3, a strategy can be giving prizes or awards to the farmers who cultivate diversity, and Boyce notes that those awards could also be given to the MARA officials who encourage those farmers to continue these practices.[19]

---

[19] For example, an official said that sometimes farmers come to them with a wild variety of wheat that they have found near the cemetery with the aim to use in their field, and to ask about its characteristics, which he noted are usually genetically rich but weak in terms of yield.

5.4.2. Participatory Plant Breeding

If the traditional varieties can be used as the basis of crop improvement programs with the participation of farmers who will use the results, this can provide incentives for the farmers to continue the cultivation of landraces. Such a strategy would be possible by building linkages between crop breeding research programs and farm level crop development.[20] A top-down approach that imposes a particular strategy without the recognition of farmers' practices such as seed exchange, farmers innovations, and their shared knowledge may have destructive effects on these practices.

5.4.3. Establishment of Local Markets for Traditional Varieties

Another strategy can be the establishment of local markets for landraces with higher prices for them. The yield of landraces will be lower than the modern varieties, but the higher prices will compensate the 'loss' perceived by younger farmers because of cultivating landraces. As such, this would have the impact of both increasing the economic value of landraces which appear to be important particularly for the younger farmers who favor abandoning them for modern varieties, *and* symbolically affirming the value of landraces with respect to farmers' preferences. This can be particularly useful as long as farmers' preferences for the traditional variety are important, in addition to yield.

---

[20] Walter de Boef, Kojo Amanor, Kate Wellard, with Anthony Bebbington, Cultivating Knowledge: Genetic Diversity, Farmer Experimentation, and Crop Research (London: Intermediate Technology Publications, 2003).

5.4.4. Using the Direct Income System as a Means to Promote Traditional Varieties

Qualset et al. suggest that other strategies may be implemented in order to achieve specific objectives, and they can be in the form of cash or in kind payments, which will also support the farmers to continue practices of cultivating traditional varieties.[21] Indeed, the direct income system (DIS) as introduced by the WB assisted restructuring can be used as a policy strategy to support the conservation of crop genetic diversity. In its current implementation, the main criteria for receiving the DIS is engaging in agricultural production, regardless of what is being planted or what variety. One way to use DIS for conservation purposes might be to introduce a two-tier direct income support, providing general support to the farmers, and incorporating a premium for farmers who cultivate landraces of wheat, and perform environmental services. This would build on the already existing system of support, and at the same time, would broaden the constituency by supporting not only the elderly farmers who grow landraces but also those farmers who in different ways perform environmental services by their activities, for example, conserving scenic areas or beautiful landscapes (i.e. olive trees).

5.4.5. Provision of Local Public Goods

Above policy suggestions can go hand in hand with the provision of services that are designed to improve the quality of life of the community, particularly if we take into account the younger farmers' inclination toward migration when the conditions in cities become better. Boyce underlines that governments and international agencies can

---

[21] Qualset et al.

invest in local public goods in order to encourage small farmers to remain on the land, and "to provide tangible evidence of the value society places on the environmental services they provide".[22] In line with the synergy approach to social capital and coproduction strategy, this provision of local public goods services in the villages need not be necessarily organized by the government, but rather complementing local villagers' efforts to provide better living conditions in rural areas. One point that should be underlined is that these policy suggestions discussed above are not mutually exclusive.

The removal of incentives that induce the abandonment of traditional varieties, particularly in regions of diversity is also crucial. For example, the new project of certified seed that will be implemented by the MARA is a measure that will support the farmers for the use of modern varieties, and those "leader" farmers are expected to be models for the other farmers in the use of those varieties. This is a striking example where the government is able to mobilize internal financial resources for the diffusion of modern varieties on the basis that the yields are low as well as that the quality of wheat is bad, and that wheat is imported due these concerns.[23] From the farmer interviews, it is evident that the traditional varieties, at least in these provinces, despite farmers emphasis on their quality, can not find their way to the market due to lack of

---

[22] James K. Boyce, "A Future for Small Farms? Biodiversity and Sustainable Agriculture," Amherst, MA: Political Economy Research Institute, Working Paper No.86, 2004 (http://www.umass.edu/peri/pdfs/WP86.pdf), 23.

[23] The project is expected to cost 120 trillion Turkish liras. Of this, 100 trillion will be provided by the farmers, and 20 trillion will be provided by Province Special Authorities. Currently, 1 dollar amounts to approximately 1,500,000 turkish liras. The farmer will make a contract that he/she will use the certified seed for production.

demand. Here, one strategy could be to provide the farmers access to markets for products that are made from these varieties. Gökgöl noted back in the 1930s the high quality of Turkish wheat, which should attract the attention of grain buyers in the world.[24] Wheat products are the basic food and consumed in many different forms, for example, French type white bread and pasta is preferred by urban consumers, and in addition to bread, there are a wide range of products made from wheat that are intensively consumed in the cities, including simit, pide and yufka.[25] In the villages, flat bread is preferred, prepared without preservatives, it can be stored for up to six months, only requiring moisturizing shortly before consumption.[26] Other wheat products include tarhana and bulgur. However, it is the modern varieties Bezostaya 1, Kıraç 66, and Cumhuriyet which are preferred by the Turkish milling and baking industry. Boyce notes that there is a scope for the development of markets in which traditional varieties command a price premium, an example of which can be labeling systems.[27] In Turkey, there is an increasing urban demand for 'natural' or organic products, and interest in

---

[24] Mirza Gökgöl, *Türkiye'nin Bugdaylari*, quoted in Hans-Joachim Braun, Nusret Zencirci, Fahri Altay, Ayhan Atlı, Muzaffer Avcı, Vehbi Eser, Mesut Kambertay, and Thomas S. Payne, "Turkish Wheat Pool," in The World Wheat Book: A History of Wheat Breeding, Alain P. Bonjean and William J. Angus eds. (Paris: Lavoisier Publishing, 2001): 851-879.

[25]Hans-Joachim Braun et al. Simit is sesame seed coated rings of bread, pide is baked fresh to serve in restaurants. Also during the Ramadan, it is widely consumed in iftar, the first meal after a day's fasting, and is sold in bakeries for home consumption. Yufka is a thin sheet of dough used in the preparation of sweets.

[26] Ibid.

[27] James K. Boyce, "A Future for Small Farms? Biodiversity and Sustainable Agriculture,"

"village bread" which is being sold in the market, though these breads are not 'village bread' because of the type of variety, but the use of sourdough. One strategy could be to provide channels for the traditional varieties of wheat to be used in the making of these bread and other products, and labeling them as such. Currently, some NGOs, like the Wheat group in Istanbul[28], are working on direct provision of farmers' organic products to consumers without intermediaries.

These are the suggestions that can be undertaken in the Turkish context for the continuation of the cultivation of traditional varieties. Based on the field work that I conducted in the northern Aegean and the Western Transitional Zone, the Turkish case in the conservation of crop genetic resources show that there is not an inevitable trade off between cultivating modern and traditional varieties. The available data on the area for landrace cultivation show that there is a decrease from 17.4 % of the total wheat area in 1990 to 10.7 % today. Given the discussion presented above, unless measures are taken to support farmers for the cultivation of traditional varieties, it is highly unlikely that they will continue these practices.

The farmers produce a positive externality by the cultivation of landraces, in view of long-term contribution to the world's crop genetic diversity, which is crucial for global food security and has an intergenerational aspect. It is at this point where there is a link from the local to the global. In the Turkish context, it is important to note the limitations of the conventional notion of efficiency as exemplified by the agricultural liberalization undertaken by the government, and directed and assisted by the IMF and

[28] The Wheat (Buğday) group is an non-governmental association engaging in activities aimed at creating awareness and supporting ecological livelihoods. They regularly publish the Buğday magazine. More information: http://www.bugday.org/eng

the World Bank, which focuses on increases in agricultural production based on the market process in the short term. This notion of efficiency does not take into account this positive externality produced by the farmers. A broader notion of efficiency that internalizes this positive externality, namely, the value of this public good, crop genetic diversity, can be extremely important in the long-term conservation of genetic resources. In this context, one suggestion derived from the implications of local agricultural practices that conserve crop genetic diversity is that the IMF and the World Bank take on this broader notion of efficiency, which will have significant policy implications for the conservation of crop genetic resources in centers of diversity and/or origin.

Perrings and Gadgil note that the global cost of the local loss of landraces and wild relatives is "the foregone opportunity to use their genetic material to breed or engineer desirable traits in crops that could be cultivated worldwide".[29] Farmers, through their cultivation of landraces, create a global public good. Perrings and Gadgil argue that the communities, who seek to relate their conservation to the global public good, will find themselves linked to international markets and actors with more power, information and skills. In terms of international institutional arrangements, they note that if local communities are to be compensated for agroecosystem conservation efforts that yield global benefits, the Global Environmental Facility's focus and resources need to be extended. A financially strengthened GEF, they underline, might serve both the CBD and the International Treaty on Plant Genetic Resources for Food and Agriculture

[29] Charles Perrings and Madhav Gadgil, "Conserving Biodiversity: Reconciling Local and Global Public Benefits," 539.

by addressing the incremental costs of biodiversity conservation in agroecosystems, and the main beneficiaries would be small farmers, as custodians of agricultural biodiversity. This approach would also reflect the concerns of developing countries, which argue that the loss of species in local production systems, particularly the loss of crop genetic diversity, has been undervalued in global conservation strategies.

As such, one question that should be asked is whether the Turkish experience in biodiversity conservation and landrace practices could be generalized to other countries? Turkey represents a gene-rich country in domesticated species, a party to the CBD and able to receive GEF funding due to its existing capacity in *ex situ* conservation provided through collaboration with the FAO, with domestic scientific capability and at the same time, in a process of accelerated agricultural liberalization, an expected model as perceived by the IMF and the World Bank. Many of the countries that are gene-rich, not only in wildlife species but particularly in domesticated crops (which is the focus of this dissertation) are the developing countries. The table below presents information on the WB/IMF loans in selected countries that are centers of diversity and/or origin of the world's major crops. According to Vavilov, there is a strong correlation between ancient centers of origin and modern centers of genetic diversity, for example rice originated in the eastern Indian subcontinent; wheat originated in the fertile crescent spanning parts of Turkey, Syria and Iraq, with secondary centers in Ethiopia and central Asia; maize in southern and central Mexico and Guatemala; potatoes, on the Andean slopes of Peru.[30]

---

[30] James K. Boyce, "Ecological Distribution, Agricultural Trade Liberalization, and *In Situ* Genetic Diversity," Journal of Income Distribution 6, 2 (1996): 265-286.

Table 5.1. Countries in Regions of Crop Diversity and WB-IMF Loans

Country	years	WB-IMF loans as a ratio of GDP(%)	WB-IMF loans as a ratio of total external debt (%)	Principal and interest payments of WB loans as a ratio of total exports (%)	Interest payments of the WB loans as a ratio of government expenditure (%)
Ethiopia	1981	0.0	0.0	1.7	Na.
	1991	20.0	11.1	7.0	Na.
	2000	33.3	40.0	3.7	Na.
	2001	33.3	33.3	2.9	Na.
Guatemala	1981	1.1	10.0	1.0	Na.
	1991	3.1	9.3	1.9	Na.
	2000	1.5	7.3	0.9	Na.
	2001	1.7	6.6	0.9	Na.
India	1981	4.8	39.1	1.7	0.5
	1991	15.6	30.6	9.7	2.0
	2000	5.7	26.3	3.0	0.8
	2001	5.5	26.8	2.5	0.7
Mexico	1981	0.8	2.6	1.1	Na.
	1991	6.1	16.7	3.5	2.2
	2000	1.9	7.0	1.2	1.1
	2001	1.8	7.0	1.3	Na.
Peru	1981	0.0	0.0	1.2	1.2
	1991	8.3	9.5	6.0	2.5
	2000	7.5	13.8	3.3	2.1
	2001	5.6	10.7	3.5	2.1
Philippines	1981	5.6	9.5	1.5	2.8
	1991	11.1	15.6	4.7	4.4
	2000	8.0	12.0	1.4	1.7
	2001	7.0	9.6	1.4	1.5
Turkey	1981	4.5	15.8	3.1	6.6
	1991	4.0	11.8	5.4	1.9
	2000	4.0	6.8	1.5	0.3
	2001	12.8	16.5	1.5	0.4

Source: World Bank Development Indicators 2003.

NOTE: In the above table, first column shows total debt outstanding and disbursement of IBRD loans, IDA credits, and IMF credits as a ratio of GDP. Second column shows the share of these loans in the total external debt of the countries. Third column looks at the ratio of debt servicing (principal and interest payments) over total exports of the countries. Last column indicates the interest payment of the loans as a ratio of the total government expenditure.

Table 5.2. Countries in Regions of Crop Diversity and total WB Credits Committed

Countries	Total World Bank credits committed as of 2003 (in US$ billions)	Allocation of those credits to the agriculture related projects (as percentage of the total)
Ethiopia	1.9	10
India	13	22
Mexico	3.8	34[a]
Peru	0.6	25
Philippines	1.09	31
Turkey	9.9	7.7

Source: Various Country Briefs www.worldbank.org.
a. Agriculture and environment related projects.

As Rosendal notes, the CBD embodies several principles of significance to developing countries by establishing national sovereignty over biological resources, equitable sharing of the benefits from use of biological resources, financial and technological transfers linked to access to these resources, and a shared responsibility for costs of conservation.31 As such, the biodiversity issue can be translated into domestic policy making. Yet, on the other hand, as the discussion on Turkey reveals, particularly for agricultural biodiversity, there is an overlap of the CBD institution/regime with the neoliberal economic institution/regime with agricultural efficiency priorities based on market oriented production. The Turkish experience provides a framework for further research on the factors at the conservation of

[31] Kristin Rosendal, The Convention on Biological Diversity and Developing Countries (Dordrecht: Kluwer Academic Publishers, 2000).

biodiversity and crop genetic diversity in those countries rich in domesticated species and undergoing agricultural liberalization in their economies.

APPENDIX A

LIST OF INTERVIEWS

Academics:

Prof. Dr. Neşet Kılınçer Executive Secretary of the Agriculture, Forestry and Food Technologies Research Grant Committee (TUBITAK), Ankara.

Prof. Dr. Aykut Kence Department of Biology, Middle Eastern Technical University, Ankara.

Prof. Dr. Hüseyin Avni Oktem, Department of Biology, Middle Eastern Technical University, Ankara.

Assoc. Prof. Mahinur Akkaya, Department of Chemistry, Middle East Technical University, Ankara.

Prof. Dr. Seminur Topal, Department of Chemistry and Metalurgy Engineering, Yıldız Technical University, Istanbul.

Prof. Dr. Tuna Ekim, Science Faculty, Department of Botany, Istanbul University.

Prof. Zeki Kaya, Department of Biology, Middle Eastern Technical University, Ankara.

Ministry of Agriculture and Rural Affairs:

Dr. Vehbi Eser, Head of Department, Field Crops Research Department, General Directorate of Agricultural Research, MARA, Ankara.

Dr. Muzaffer Kızıltan, Deputy General Director, General Directorate of Agricultural Research, MARA, Ankara.

Muzaffer Sürek, Agricultural Engineer, General Directorate of Agricultural Research, MARA, Ankara.

Mehmet Uyanık, Division of Seed, MARA, Ankara.

Dr. Kenan Yalvaç, Head of the Division of Seed, MARA, Ankara.

Dr. Ayfer Tan, Head of Department, Plant Genetic Resources Research Unit, Aegean Agricultural Research Institute, GDAR, MARA, Menemen, Izmir.

Dr. Alptekin Karagöz, Plant Genetic Resources Research Unit, Central Research Institute for Field Crops, MARA, Ankara.

Derya Sağlam, Research and Planning Commission, MARA, Ankara.

Hürriyet Taşbaşlı, Department of Organic Agriculture, MARA, Ankara.

One official, MARA, Ankara.

Dr. Nusret Zencirci, Head of Department of Program and Project Evaluation, Central Research Institute for Field Crops, MARA, Ankara.

Ministry of Environment:

Neşe Hüsniye Kılıçarslan, Biologist, General Directorate of Environment Protection, Ministry of Environment, Ankara.

Mustafa Taşar, Ministry of Environment, Ankara.

One official, Ministry of Environment, Ankara.

One official, Authority for the Protection of Special Areas, Ministry of Environment, Ankara.

Ministry of Forestry:

One official, Ministry of Forestry, Ankara.

One official, Ministry of Forestry, Ankara.

Turkish Patent Institute:

Banu Avcıoğlu, Food Engineer, Patent examiner, Turkish Patent Institute, Ankara.

State Planning Organization:

Füsun Atık, Planning Expert, General Directorate of Economic Sectors and Coordination, State Planning Organization, Ankara.

Zeynep Demirhan Darvish, State Planning Organization, Ankara.

Senay Eser, State Planning Organization, Ankara.

Dilek Ulgüray, State Planning Organization, Ankara.

Aziz Babacan, State Planning Organization, Ankara.

Undersecretariat of Treasury and Undersecretariat of Foreign Trade:

Ahmet Levent Yener, Head of Department, General Directorate of State Owned Enterprises, Republic of Turkey Prime Ministry, The Undersecretariat of Treasury, Ankara.

Sinan Yanaz, Foreign Trade Expert, Republic of Turkey Prime Ministry, Undersecretariat of Foreign Trade, Ankara.

Hamdi Aydin, Senior Financial Analyst, General Directorate of State Economic Enterprises, ARIP Project Coordination Unit, Republic of Turkey Prime Ministry, Undersecretariat of Treasury, Ankara.

One official, General Directorate of State Economic Enterprises, ARIP Project Coordination Unit, Republic of Turkey Prime Ministry, Undersecretariat of Treasury, Ankara.

Representatives of Agricultural Groups:

Dr. Gökhan Günaydın, Chairman of Board, Chamber of Agricultural Engineers, Ankara.

Saim Dağ, Vice-president, Union of Agricultural Chambers, Ankara.

Ayhan Elçi, General Secretary, Turkish Seed Industry Association, Ankara.

FAO, UNDP and CIMMYT (Turkey Offices):

Taylan Onul, National Professional Officer, FAO, Ankara.

Dr. Julie M. Nicol, Pathologist, Wheat Program, Turkey, CIMMYT, Ankara.

Bilgi Buluş, National Coordinator, UNDP, Global Environmental Facility, Small Grants Programme, Ankara.

NGOs:

Güneşin Aydemir, Project Executant, Society for the Protection of Nature, Istanbul.

Sema Atay, Project Director, Society for the Protection of Nature, Istanbul

Victor Ananias, Buğday Grubu (Wheat Group), Istanbul.

A representative, S.O.S. Environmental Volunteers, Istanbul.

APPENDIX B

FARMER INTERVIEW QUESTIONS

1) (a) What crops do you grow? (A full list of crops)
   (b) How many acres of each of these crops do you grow? Is there any multiple cropping?
2) (a) What type of wheat do you grow on the land allocated to the wheat?
   (b) Do you grow traditional varieties?
   (c) Of your acres of wheat, how many acres of this is under traditional varieties? How many is under modern?
3) (a) Why do you grow traditional varieties?
   (b) Why do you grow modern varieties?
4) On which part of your land do you grow traditional varieties? Why?
5) (a) What do you do with the output from traditional varieties? (household consumption or selling in the markets)
   (b) What do you do with the output from modern varieties?
   (c) Do you make bread at home? Which variety do you use for it? Why?
6) (a) What percentage of your output from traditional varieties do you sell in the market or consume at household?
   (b) What percentage of your output from modern varieties do you sell in the market or consume at household?
7) (a) Is there a price differentiation between traditional and modern varieties at the market?
   (b) What is the price of traditional and modern variety at the market?
8) Who do you sell your wheat output to?
9) How far is the market from your village?
10) Do buyers like traditional varieties? (bread made out of it)
11) (a) How do you obtain the seed for traditional variety?
   (b) How do you obtain the seed for modern variety?
   (c) Is there any price differential between the seed you get from the State Agriculture Institute and from the merchant? Which one do you prefer?
12) (a) Do you get involved in seed exchange with the other farmers?
   (b) Which one do you exchange more: Traditional or modern varieties?
13) With whom do you exchange your seeds? Why?
14) (a) Do you use fertilizers? Do you use manure or chemical?
   (b) What type of fertilizer do you use for traditional varieties?
   (c) What type of fertilizer do you use for modern varieties?
15) (a) Do you use pesticides?
   (b) Do you use it with traditional varieties?
   (c) Do you use it with modern varieties?
16) (a) Do you have irrigation?
   (b) Do you have irrigation on all of your land or some of it?
   (c) Do you grow traditional variety or modern variety on the irrigated part of your land?
17) For the key crops:
   (a) What is the average yield of traditional varieties?
   (b) What is the average yield of modern varieties?

18) Has there been any change regarding the crop(s) you cultivated in the last couple of years? If your answer is yes, then why?
19) Has there been any change regarding the wheat varieties you cultivated in the last couple of years? When? Why?
20) When did you start to cultivate modern varieties? Why?
21) Is there any state-sponsored agricultural project in your village (e.g., educational programs, seed distribution, etc.)? If there is, then, does it have an impact on your choice of crops and varieties? How do local agricultural officials work? How would you describe your relationship with them?
22) Do you get any support from the state (e.g.., loans from the State Agricultural Institute)? Has there been any change in terms of state support recently? Did the recent changes affect your decisions about what to cultivate and the amount of cultivation?
23) What are the income sources other than agriculture in your village? Do you work outside the village? Where? Why?
24) Has there been any migration from the village? If yes, when did it start? Do you observe a significant change in the last period? What do you think are the reasons for migration?
25) Do you utilize "imece" (collective work) in the village? What kinds of activities are done by "imece"? Is there any co-operative?
26) Do you own the land?
    IF not:
    (a) Do you cultivate the land by paying a fixed rent or shared rent?
    (b) When you make decisions about what crops to cultivate, do you or the landlord or both of you make the decision?
27) (a) How old are you?
    (b) How many people are there in your household?
    (c) Status of education?
    (d) How many people in your household do work on the land?
    (e) Do you have a tractor?
28) In your opinion, what are the three main problems of your village?

BIBLIOGRAPHY

Adler, Emanuel and Peter M. Haas. "Conclusion: epistemic communities, world order, and the creation of a reflective research program." *International Organization* 46, no.1 (Winter 1992): 367-390.

Aggarwal, Vinod K. "Reconciling Multiple Institutions: Bargaining, Linkages and Nesting." in *Institutional Designs for a Complex World: Bargaining, Linkages, and Nesting*, Vinod K. Aggarwal ed. Ithaca: Cornell University Press, 1998.

Agrawal, Arun "Common Property Institutions and Sustainable Governance of Resources" *World Development* 29, 10 (2001): 1649-1672.

Albayrak, Nurşen."Wheat Supply Response: Some Evidence on Aggregation Issues" *Development Policy Review* 16, (1998): 241-263.

Aydın, Zülküf. "The World Bank and the Transformation of Turkish Agriculture." in *The Political and Socioeconomic Transformation of Turkey*. pp. 111-134. Atilla Eralp, IbrahimTünay and Birol Yeşilada eds. Westport: Praeger Publishers, 1993.

Aydın, Zülküf. "Yapisal Uyum Politikalari ve Kirsal Alanda Beka Stratejilerinin Ozellestirilmesi." (Structural Adjustment Policies and Privatization of Rural Livelihoods), *Toplum ve Bilim* 88 (2001).

Aydın, Zülküf. "The New Right, Structural Adjustment, and Turkish Agriculture." *The European Journal of Development Research* 14, 2 (2002): 183-208.

Baer, Karen W. "A Theory of Intellectual Property and Biodiversity Treaty." *Syracuse Journal of International Law and Comm.*, 21 (1995).

Baffes, John and Harry de Gorter. "Decoupling Support to Agriculture: An Economic Analysis of Recent Experience." Paper presented at Annual Bank Conference on Development Economics-Europe, Paris, May 15-16, 2003.

Bakir, O. "Management systems for in situ conservation of plants." in *Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity.* N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998.

Bardsley, Douglas. "Risk Alleviation via In Situ Agrobiodiversity conservation: drawing from experiences in Switzerland, Turkey and Nepal." *Agriculture, Ecosystems and Environment* 99 (2003): 149-157.

Bebbington, Anthony. "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty." *World Development* 27, 12, (1999): 2021-2044.

Berkes, Fikret. "Cross Scale Institutional Linkages: Perspectives from the Bottom Up." Paper prepared for NAS/NRC Panel on Institutions for Managing the Commons, 2000.

Berkes, Fikret, Johan Colding, and Carl Folke eds. *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change.* Cambridge, U.K.; New York: Cambridge University Press, 2003.

Boyce, James K. "Ecological Distribution, Agricultural Trade Liberalization, and *In Situ* Genetic Diversity." *Journal of Income Distribution* 6, 2 (1996): 265-286.

Boyce, James K. "A Future for Small Farms? Biodiversity and Sustainable Agriculture." Amherst, MA: Political Economy Research Institute, Working Paper No.86, 2004. (http://www.umass.edu/peri/pdfs/WP86.pdf) August 15, 2004.

Braun, Hans-Joachim, Nusret Zencirci, Fahri Altay, Ayhan Atlı, Muzaffer Avcı, Vehbi Eser, Mesut Kambertay, and Thomas S. Payne. "Turkish Wheat Pool." in *The World Wheat Book: A History of Wheat Breeding.* 851-879. Alain P. Bonjean and William J. Angus eds. Paris: Lavoisier Publishing, 2001.

Brush, Stephen B. "Farmers Rights and Genetic Conservation in Traditional Farming Systems." *World Development* 20, 11 (1992): 1617-1630.

Brush, Stephen B. "In Situ Conservation of Landraces in Centers of Crop Diversity." *Crop Science*, 35 (1995): 346-354.

Brush, Stephen B. "Is Common Heritage Outmoded?" in *Valuing Local Knowledge: Indigenous People and Intellectual Property Rights.* Stephen B. Brush and Doreen Stabinsky eds. Washington D.C.: Island Press, 1996.

Brush, Stephen B. "Bio Cooperation and the Benefits of Crop Genetic Resources: The Case of Mexican Maize." *World Development* 26, 5 (1998): 755-766.

Brush, Stephen B. "The issues of in situ conservation of crop genetic resources." in *Genes in the Field: On-farm Conservation of Crop Diversity*, 1-28. Stephen B. Brush ed. Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000.

Brush, Stephen B. ed. *Genes in the Field: On-farm Conservation of Crop Diversity.* Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000.

Brush, Stephen B. (2003) "The Demise of 'Common Heritage' and Protection for Traditional Agricultural Knowledge" Paper presented at Conference on Biodiversity, Biotechnology, and the Protection of Traditional Knowledge, St. Louis, MO.

Brush, Stephen B. "The Lighthouse and the Potato: Internalizing the Value of Crop Genetic Diversity." in *Natural Assets: Democratizing Environmental Ownership*, 187-205. James K. Boyce and Barry Shelley, eds. Washington DC: Island Press, 2003.

Brush, Stephen B. and Erika CH Meng. "Farmers Valuation and Conservation of Crop Genetic Resources." *Genetic Resources and Crop Evolution*, 45 (1998): 139-150.

Brush, Stephen B. and Erika CH Meng, "The Value of Wheat Genetic Resources to Farmers in Turkey." in *Agricultural Values of Plant Genetic Resources*, 97-113. Robert E. Evenson, Douglas Gollin, and Vittorio Santaniello eds. Wallingford, UK; New York: CAB International, 1998.

Carlson, Jonathan C. "Strengthening the Property Rights Regime for Plant Genetic Resources: The Role of the World Bank." *Transnational Law and Contemporary Problems* 6, 1 (1996): 91-122.

Cass, Loren."Rhetoric Versus Reality: Ideas and Material Interests in the Development of German, British, and American Climate Policy 1987-1991." Paper presented at the Northeastern Political Science Association Meeting, Philadelphia 2001.

Chandler, Melinda. "The Biodiversity Convention: Selected Issues of Interest to the International Lawyer." *Colorado Journal of International Law and Policy* 4 (1993): 141-175.

Chayes, Abram, Antonia Handler Chayes and Ronald B. Mitchell. "Managing Compliance: A Comparative Perspective." in *Engaging Countries: Strengthening Compliance with International Environmental Accords*, Harold K. Jacobson and Edith Brown Weiss, eds. Cambridge, Mass.: The MIT Press, 1998.

Clements, Paul and Emily Hauptmann. "The Reasonable and Rational Capacities in Political Analysis." *Politics and Society*, 30,1 (2002): 85-111.

Collier, David. "The Comparative Method." in *Political Science: The State of the Discipline*. Ada Finifter ed. Washington D.C.: American Political Science Association, 1993.

Collier, David. "Translating Quantitative Methods for Qualitative Researchers: The Case of Selection Bias." *American Political Science Review* 89, 2 (1995): 461-466.

de Boef, Walter, Kojo Amanor, Kate Wellard, with Anthony Bebbington. *Cultivating Knowledge: Genetic Diversity, Farmer Experimentation, and Crop Research.* London: Intermediate Technology Publications, 1993.

de Klemm, Cyril. (1993) "Biological Diversity Conservation and the Law: Legal mechanisms for conserving species and ecosystems." IUCN Environmental Policy and Law Paper, No. 29.

Dellal, Ilkay, U. Gul, and H. Anac, *Wheat Situation and Outlook: 2003/2004* AERI Situation and Outlook Reports, Ankara, 2003.

Diversity, "Cutting Edge Conservation Techniques are Tested in the Cradle of Ancient Agriculture: GEF Turkish Project is a Global Model for *In Situ* Conservation of Wild Crop Relatives," *Diversity* 16, 4 (2000), 15-18.

Doğruel, Fatma, Suut Doğruel, and Erinc Yeldan. "Macroeconomics of Turkey's Agricultural Reforms: An Intertemporal Computable General Equilibrium Analysis." *Journal of Policy Modelling* 25 (2003): 617-637.

Eder, Mine. "Political Economy of Agricultural Reforms in Turkey." in *La Turquie et le développement*, 211-245. Ahmet Insel ed. (Paris: L'Harmattan, 2003).

Ekim, Tuna. "Plants." in *Türkiye'nin Biyolojik Zenginliği* (Turkey's Biological Riches), Aykut Kence ed. Ankara: TCSV, 1987.

Ekim, Tuna. "Biological Diversity." *Proceedings of the Symposium on the History of Environment and Environmental Protection in Turkey*, organized by Turkish Economic and Social History Foundation, 2000.

Ertürk, Yakın "Research on Rural Communities in Turkey." in *Science and Research Policy in Turkish Agriculture*. Ahmet Bayaner and Bozkurt eds. Ankara: Agricultural Economics Research Institute (AERI) Publications, 1999.

Evans, Peter. "Government Action, Social Capital and Development." *World Development* 24, 6 (1996): 1119-1132.

Fairman, David. "The Global Environmental Facility: Haunted by the Shadow of the Future." in *Institutions for Environmental Aid: Pitfalls and Promise*, 55-87. Robert O. Keohane and Marc A. Levy eds. (Cambridge, MA.: The MIT Press, 1996).

Fırat, Ertuğ and Ayfer Tan. "Turkey Maintains Pivotal Role in Global Genetic Resources." *Diversity* 11, 1&2, (1995): 61-63.

Fırat, Ertuğ and Ayfer Tan. "*In Situ* Conservation of Genetic Diversity in Turkey." in *Plant Genetic Conservation: The In Situ Approach.* Nigel Maxted, Brian Ford-Lloyd, and John Gregory Hawkes , eds. London; New York: Chapman & Hall, 1997.

Flitner, Michael. "Biodiversity: of Local Commons and Global Commodities." in *Privatizing Nature: Political Strategies for the Global Commons.* 144-166. Michael Goldman eds. New Brunswick, N.J.: Rutgers University Press, 1998.

Food and Agriculture Organization of the United Nations, *The State of the World's Plant Genetic Resources for Food and Agriculture.* Rome, 1998.

Food and Agriculture Organization (FAO), Food and Agriculture Indicators, Country: Turkey, (http://www.fao.org/es/ess/compendium_2004/pdf/ESS_TUR.pdf). August 25, 2004.

Frisvold, George B. and Peter T. Condon, "The Convention on Biological Diversity and Agriculture: Implications and Unresolved Debates." *World Development* 26, 4 (1998): 551-570.

Gari, Josep-Antoni. "Biodiversity Conservation and Use: Local and Global Considerations." Science, Technology and Development Discussion Paper No.7, Center for International Development and Belfer Center for Science and International Affairs, Harvard University, 1999.

George, Alexander and Timothy McKeown. "Case Studies and Theories of Organizational Decision Making." *Advances in Information Processing in Organizations* 2 (1985): 21-58.

Global Biodiversity Outlook (2001), Secretariat of the Convention on Biological Diversity, Montreal.

Gökgöl, Mirza *Türkiye'nin Buğdayları* (Turkey's Wheat) Tarım Bakanlığı Istanbul Yeşilköy Tohum Islah ve Yetiştirme Enstitüsü, 1935.

Granovetter, Mark. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91, 3 (1985): 481-510.

Haas, Peter M. "Epistemic Communities and the Dynamics of International Environmental Cooperation." in Volker Rittberger ed. *Regime Theory and International Relations*. Oxford: Clarendon Press, 1993.

Haas, Peter M. Robert O. Keohane and Marc A. Levy, eds. *Institutions for the Earth: Sources of Effective International Environmental Protection*. Cambridge, Mass.: The MIT Press, 1993.

Haas, Peter M. "The Future of International Environmental Governance." Global Peace and Conflict Studies at UC Irvine. Working Paper 96-1, 1996.

Haas, Peter M. "Why Comply, or some Hypotheses in Search of an Analyst." in *International Compliance with Nonbinding Accords*, Edith Brown Weiss, ed. Studies in Transnational Legal Policy, No.29, The American Society of International Law, 1997.

Haas, Peter M. "Social Constructivism and the Evolution of Multilateral Environmental Governance" in *Globalization and Governance*, 103-133. Aseem Prakash and Jeffrey A. Hart, eds. London; New York: Routledge, 1999.

Haas, Peter M. "Choosing to Comply? Theorizing from International Relations and Comparative Politics." in *Commitment and Compliance: The Role of Non-binding Norms in the International Legal System*, Dinah Shelton ed. Oxford; New York: Oxford University Press, 2000.

Haas, Peter M. "International Institutions and Social Learning in the Management of Global Environmental Risks." *Policy Studies Journal*, 28, 3 (2000): 558-575.

Haas, Peter M. "Compliance with EU Directives: Insights from International Relations and Comparative Politics." *Journal of European Public Policy* 5, 1 (1998): 17-37. Reprinted in *Environment in the New Global Economy,* Peter M. Haas ed. Cheltenham, UK; Northampton MA: Edward Elgar, 2003.

Hanf, Kenneth and Arild Underdal. *International Environmental Agreements and Domestic Politics: The Case of Acid Rain*. London: Ashgate Studies in Environmental Policy and Practice, 2000.

Hasenclever, Andreas, Peter Mayer, and Volker Rittberger. "Interests, power, knowledge: The Study of International Regimes." *Mershon International Studies Review* 40, (1996): 177-228.

Hendricks, B. "Transformative Possibilities: Reinventing the Convention on Biological Diversity." in *Protection of Global Biodiversity: Converging Strategies*, Lakshman Guruswamy and Jeffrey A. McNeely eds. Durham and London: Duke University Press, 1998.

Isakson, Ryan. "Cultivated Genetic Diversity, Traditional Agricultural Knowledge, and Intellectual Property Rights: A Modern Day Enclosure of the Commons?" Unpublished Paper, 2000.

Jacobson, Harold K. and Edith Brown Weiss, "A Framework for Analysis.' in *Engaging Countries: Strengthening Compliance with International Environmental Accords*, Harold K. Jacobson and Edith Brown Weiss eds. Cambridge, Mass.: The MIT Press, 1998.

Jarvis, Devra and Toby Hodgkin. "Farmer decision making and genetic diversity: Linking multidisciplinary research to implementation on farm." in *Genes in the Field: On-farm Conservation of Crop Diversity*. Stephen B. Brush ed. Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000.

Jepperson, Ronald L. Alexander Wendt and Peter J. Katzenstein, "Norms, Identity and Culture in National Security," in *The Culture of National Security: Norms and Identity in World Politics,* Peter J. Katzenstein ed. New York: Columbia University Press, 1996.

Juma, Calestous. "Intellectual Property Rights and Globalization: Implications for Developing Countries." Science, Technology and Development Discussion Paper No.4, Center for International Development, Harvard University, 1999.

Karagöz, Alptekin. "In Situ Conservation of Plant Genetic Resources in the Ceylanpinar State Farm," in *Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity.* N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998.

Karagöz, Alptekin and Nusret Zencirci. "Variation in Wheat (triticum spp.) landraces from different altitudes of three regions in Turkey." *Genetic Resources and Crop Evolution*, forthcoming, (2004).

Katz, Elizabeth. "Social Capital and Natural Capital: A Comparative Analysis of Land Tenure and Natural Resource Management in Guatemala." *Land Economics* 76, 1 (2000): 114-132.

Kaya, Zeki, Ekrem Kün, and Adil Güner. *National Plan for In situ Conservation of Plant Genetic Diversity in Turkey*. Ministry of Environment: Environment Protection General Directorate, Protection of Plant and Anti-Erosion Department. September 1998.

Kence, Aykut. *Biological Diversity in Turkey*, Ankara, EPFT Publications, 1987.

Keohane, Robert O. "Structural Realism and Beyond." in *Neorealism and its Critics*, Robert O. Keohane ed. New York: Columbia University Press, 1986.

Keohane, Robert O., Peter M. Haas and Marc A. Levy. "The Effectiveness of International Environmental Institutions." in *Institutions for the Earth: Sources of Effective International Environmental Protection*, Peter M. Haas, Robert O. Keohane and Marc A. Levy, eds. Cambridge, Mass.: The MIT Press, 1993.

Keohane, Robert O. and Lisa L. Martin, "The Promise of Institutionalist Theory." *International Security* 20,1 (Summer 1995): 39-51.

Kışlalıoğlu, Mine and Fikret Berkes, *Ekoloji ve Cevre Bilimleri.* (Ecology and Environmental Sciences) Istanbul: Remzi Kitabevi, 1994.

Kimball, Lee. "Institutional Linkages Between the CBD and Other International Conventions." *RECIEL* 6, 3 (1997): 239-248.

Kindleberger, Charles. "International Public Goods without International Government." *American Economic Review*, 76 (1986): 1-13.

King, George, Robert O. Keohane, and Sidney Verba. *Designing Social Inquiry: Scientific Inference in Qualitative Research.* Princeton, NJ: Princeton University Press, 1994.

Krasner, Stephen D. "Structural causes and regime consequences: regimes as intervening variables." *International Organization* 36, 2, (1982): 185-204.

Levy, Marc A. Robert O. Keohane, and Peter M. Haas, "Improving the Effectiveness of International Environmental Institutions," in Peter M. Haas, Robert O. Keohane and Marc A. Levy eds. *Institutions for the Earth: Sources of Effective International Environmental Protection.* Cambridge, Mass.: The MIT Press, 1993.

Lowndes, Vivien and David Wilson. "Social Capital and Local Governance: Exploring the Institutional Design Variable." *Political Studies* 49, 4 (2001): 629-647.

Lundell, Mark, Julian Lampietti, Rashid Pertev, Lorenz Pohlmeier, Halis Akder, Ebru Ocek, and Shreyasi Jha, "Turkey: A Review of the Impact of the Reform of Agricultural Sector Subsidization." Environmentally and Socially Sustainable Development Unit Europe and Central Asia Region. The World Bank, March 9, 2004.

March, James G. and Johan P. Olsen, "The Institutional Dynamics of International Political Orders." *International Organization* 52, 4 (1998): 943-970.

Martin, Lisa L. and Beth A. Simmons, "Theories and Empirical Studies of International Institutions." *International Organization* 52, 4 (1998): 729-757.

McGinnis, Michael and Elinor Ostrom, "Design Principles for Local and Global Commons." in Robert O. Keohane, Michael McGinnis, and Elinor Ostrom eds. *Proceedings of a Conference on Linking Local and Global Commons,* held at Harvard University, April, 1992.

McGraw, Desiree. "The CBD: Key Characteristics and Implications for Implementation." *RECIEL* 11, 1 (2002): 17-28.

McManis, Charles. "The Interface between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology." *Washington University Law Quarterly* 76, 1 (1998): 255-279.

Mearsheimer, John J. "The False Promise of International Institutions," *International Security* 19, 3 (Winter 1994/95): 5-49.

Meng, Erika CH, J. Edward Taylor, and Stephen B. Brush. "Implications for the conservation of wheat landraces in Turkey from a household model of variety choice." in *Farmers, Gene Banks and Crop Breeding: Economic Analysis of Diversity in Wheat, Maize and Rice*, 127-142. Melinda Smale ed. Dordrecht: Kluwer Academic Publishers, 1998.

Minutes of the Chiapas Meeting on Crop Genetic Diversity and Rural Livelihoods, June 28-30, 2001. (http://www.umass.edu/peri/programs/development/cropdiversity.htm) July 12, 2004.

Mitchell, Ronald B. "Of course International Institutions Matter: But When and How?" in *Proceedings of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change and the Nation State*. 16-25. Frank Biermann, Rainer Brohm and Klaus Dingwerth eds. Potsdam, Potsdam Institute for Climate Impact Research, 2002.

Mitchell, Ronald B. "Compliance Theory: A Synthesis." *Review of European Community and International Environmental Law* 2, 4 (1993): 327-34; also in *Environment in the New Global Economy: Volume II Applications,* Peter M. Haas ed. Cheltenham, UK; Northampton MA: Edward Elgar, 2003.

Mutlu, Servet. "Credit in Turkish Agriculture: Its Quantity, Distribution, and Triple Bias." *METU Studies in Development* 19, 3 (1992): 361-396.

National Biodiversity Strategy and Action Plan, (NBSAP) Turkey.

National Research Council (NRC), *Crop Diversity: Institutional Responses in Managing Global Genetic Resources: Agricultural Crop Issues and Politics.* Washington DC: National Academy Press, 1993.

Nee, Victor. "Sources of New Institutionalism." in *The New Institutionalism in Sociology*, Mary C. Brinton and Victor Nee eds. New York: Russell Sage Foundation, 1998.

Orlove, Benjamin S. and Stephen B. Brush, "Anthropology and the Conservation of Biodiversity." *Annual Review of Anthropology*, 25, 1 (1996): 329-52.

Ostrom, Elinor. "Crossing the Great Divide: Coproduction, Synergy and Development." *World Development* 24, 6 (1996): 1073-1087.

Ostrom, Elinor."Scales, Polycentricity, and Incentives: Designing Complexity to Govern Complexity." in *Protection of Global Biodiversity: Converging Strategies,* Lakshman Guruswamy and Jeffrey A. McNeely eds. Durham, N.C.: Duke University Press, 1998.

Ostrom, Elinor, Larry Schroeder, and Susan Wynne eds. *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective.* Boulder: Westview Press, 1993.

Oyan, Oğuz. "From Agricultural Policies to an Agriculture without Policies" in *Ravages of Neoliberalism: Economy, Society, and Gender in Turkey.* Nese Balkan and Sungur Savran eds. New York: Nova Science Publishers, 2002.

Ozgen, Murat, Sait Adak, Alptekin Karagöz, and Hakan Ulukan, "Bitkisel Gen Kaynaklarının Korunma ve Kullanımı." (The Conservation and Use of Plant Genetic Diversity), Türk Tarım Kongresi, 1995.

Ozhatay, Melahat, Andrew Byfield and Sema Atay, *Türkiye'nin Onemli Bitki Alanları.* (Turkey's Important Plant Areas) WWF Turkey: Doğal Hayatı Koruma Vakfı, 2003.

Pagiola, Stefano, John Kellenberg, Lard Vidaeus, and Jitendra Srivastava. "Mainstreaming Biodiversity in Agricultural Development: Toward Good Practice." World Bank Environment Paper No.15, 1997.

Perrings, Charles and Madhav Gadgil "Conserving Biodiversity: Reconciling Local and Global Public Benefits." in *Providing Global Public Goods: Managing Globalization*, 532-555. Inge Kaul, Pedro Conceicao, Katell Le Goulven, and Ronald U. Mendoza, eds. New York: Published for the United Nations Development Programme [by] Oxford University Press, 2003.

Pimbert, Michel. "Issues Emerging in Implementing the Convention on Biological Diversity" *Journal of International Development* 9, 3 (1997): 415-425.

Portes, Alejandro and Julia Sensenbrenner. "Embeddedness and Immigration: Notes on the Social Determinants of Economic Action." in *The New Institutionalism in Sociology*, Mary C. Brinton and Victor Nee eds. New York: Russell Sage Foundation, 1998.

Pretty, Jules and Hugh Ward, "Social Capital and the Environment," *World Development* 29, 2 (2001): 209-227.

Purdue, Daniel. "Hegemonic Trips: World Trade, Intellectual Property and Biodiversity." *Environmental Politics* 4, 1 (1995): 88-107.

Putnam, Robert. *Making Democracy Work*. Princeton NJ: Princeton University Press, 1993.

Qualset, Calvin O. Ardeshir B. Damania, Ana Christina A. Zanatta, and Stephen B. Brush, "Locally based Crop Plant Conservation." in *Plant Genetic Conservation: The In Situ Approach.* 160-175. Nigel Maxted, Brian Ford-Lloyd, and John Gregory Hawkes, eds. London; New York: Chapman & Hall, 1997.

Rajan, Mukund Govind. *Global Environmental Politics: India and the North-South Politics of Environmental Issues*. Delhi; New York: Oxford University Press, 1997.

Raustiala, Kal. "Domestic Institutions and International Regulatory Cooperation: Comparative Responses to the Convention on Biological Diversity." *World Politics* 49, 4 (1997): 482-509.

Rhoades, Robert E. and Virginia D. Nazarea, "Local Management of Biodiversity in Traditional Agroecosystems." in *Biodiversity in Agroecosystems*. Wanda Williams Collins and Calvin O. Qualset eds. Boca Raton FL.: CRC Press, 1999.

Rosendal, Kristin. *The Convention on Biological Diversity and Developing Countries.* Dordrecht: Kluwer Academic Publishers, 2000.

Rosendal, Kristin. "Impacts of Overlapping International Regimes: The case of Biodiversity." *Global Governance* 7 (2001): 95-117.

Rosendal, Kristin. "The Convention on Biological Diversity and TRIPs: Different Approaches to Property Rights to Genetic Resources—Cause for Worry?" Project No. D 5 (Final Draft). The Fridtjof Nansen Institute, 2003.

Rosendal, K. (2003) "Interacting International Institutions: The Convention on Biological Diversity and TRIPs- Regulating Access to Genetic Resources" Paper presented at 44th Annual Convention of International Studies Association, Portland Oregon.

Sanchez, Vincent "The Convention on Biological Diversity: Negotiation and Contents." in. *Biodiplomacy: Genetic Resources and International Relations*. Vincent Sanchez and Calestous Juma eds. Nairobi: ACTS Press, 1994.

Scott, James C. *Seeing Like a State.* New Haven: Yale University Press, 1998.

Stiglitz, Joseph E. *Economics.* New York: W.W. Norton, 1997.

Swanson, Timothy. "Global Values of Biological Diversity: The Public Interest in the Conservation of Plant Genetic Resources for Agriculture." *Plant Genetic Resources Newsletter* 105 (1996): 1-7.

Swanson, Timothy. "The Source of Genetic Resource Values and the Reasons for Their Management." in *Agricultural Values of Plant Genetic Resources*. Robert E. Evenson, Douglas Gollin, and Vittorio Santaniello eds. Wallingford, UK; New York: CAB International, 1998.

Swanson, Timothy and Timo Goeschl, "Optimal Genetic Resource Conservation: *In Situ* and *Ex Situ*." in *Genes in the Field: On-farm Conservation of Crop Diversity*. 165-192. Stephen B. Brush ed. Rome: International Plant Genetic Resources Institute; Ottawa, Canada: International Development Research Centre; Boca Raton, FL: Lewis Publishers, 2000.

Tan, Ayfer. "Current Status of Plant Genetic Resources Conservation in Turkey." in *Proceedings of the International Symposium on In Situ Conservation of Plant Genetic Diversity,* 5-16. N. Zencirci, Z. Kaya, Y. Anikster, and W.T. Adams eds. Turkey, Ankara: Central Research Institute for Field Crops Publications, 1998.

Tan, Ayfer. "Importance of Public Awareness and Coordinating Mechanisms of the In situ Activities in Turkey." FAO, Plant Genetic Resources for Food and Agriculture, Central and West Asia and North Africa Regional Meeting, 22-25 June, 1998, (http://www.fao.org/ag/AGP/AGPS/pgrfa/aleppo/ayfer.htm). July 20, 2003.

Tan, Ayfer. "Agricultural Plant Diversity in Turkey." Paper presented in OECD Expert Meeting on Agri-biodiversity Indicators, Switzerland, 2001.

T.C. Başbakanlık Devlet Istatistik Enstitüsü, (State Institute of Statistics, Prime Ministry, Republic of Turkey), *Tarımsal Yapı* (Agricultural Structure), Ankara – various years.

T.C. Başbakanlık Devlet Istatistik Enstitüsü, (State Institute of Statistics, Prime Ministry, Republic of Turkey), *Tarımsal Göstergeler 1923-1998*, (Agricultural Indicators, 1923-1998), Ankara, Publication Number: 2407.

Thrupp, Lori Ann. *Cultivating Diversity: Agrobiodiversity and Food Security.*. Washington D.C.:World Resources Institute, 1998.

Thrupp, Lori Ann "Linking Agricultural Biodiversity and Food Security: The Valuable Role of Agrobiodiversity for Sustainable Agriculture." *International Affairs* 76, 2 (2000): 265-281.

Turan, Ilter. "Policymakers' Assumptions about Peasant Society. Myth or Reality" *Policy Studies Review* 4, 1 (1984): 99-109.

Turkey, Ministry of Agriculture and Rural Affairs, (MARA), (http://www.tarim.gov.tr). June 5, 2004.

Turkey, Ministry of Forestry and Environment, (http://www.cevreorman.gov.tr). August 15, 2004.

Uysal, Feyyaz. Türkiye'de Buğday ve Arpada çeşitler Itibariyle Ekilişler (Cultivation of Wheat and Barley varieties in Turkey), 1990.

Uzunlu, Vedat, Fazıl Düşünceli and Kenan Yalvaç "The Future of National Agricultural Research System (NARS) of Turkey." in Ahmet Bayaner and H. Bozkurt eds. *Science and Research Policy in Turkish Agriculture.* Ankara: AERI, 1999.

Victor, David G. Kal Raustiala, and Eugene B. Skolnikoff. eds. *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice*. Laxenberg, Austria: International Institute for Applied Systems Analysis; Cambridge, Mass.: The MIT Press, 1998.

Weiss, Edith Brown and Harold K. Jacobson, "Getting Countries to Comply with International Agreements" *Environment* 41, 6 (1999): 16-45.

Wilkes, Harrison G. "Strategies for Sustaining Crop Germplasm Preservation, Enhancement and Use." *Issues in Agriculture* No.5 (CGIAR, 1992).

Woolcock, Michael. "Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework." *Theory and Society* 27, 2 (1998): 151-208.

Woolcock, Michael and Deepa Narayan. "Social Capital: Implications for Development Theory, Research, and Policy." *The World Bank Research Observer* 15, 2 (2000): 225-249.

World Bank, Turkey-Agricultural Reform Implementation Project (ARIP), Project Information Document, Report No. PID9405. (2002). (http://www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2000/08/18/000094946_00081705310273/Rendered/PDF/multi0page.pdf). May 15, 2004.

Yalvaç, Kenan. "Advanced Agronomic Training Needs and priority agricultural research in Turkey." *Options Méditerranéennes* 36, (1999).

Yeşil Atlas, (Green Atlas), "Turkey's Protected Areas." November 2003.

Yıldırım, Tülay, W. Hartley Furtan and Alper Güzel. "A Theoretical and Empirical Analysis of Wheat Policy in Turkey," in *World Agricultural Trade*. Tülay Yıldırım Andrew Schmitz and W. Hartley Furtan eds. Boulder, Colo.: Westview Press, 1998.

Young, Oran R. *Resource Regimes: Natural Resources and Social Institutions.* Berkeley: University of California Press, 1982.

Young, Oran R. *Governance in World Affairs.* Ithaca: Cornell University Press, 1999.

Young, Oran R. ed. *Global Governance: Drawing Insights from the Environmental Experience.* Cambridge, Mass.: The MIT Press, 1999.

Young, Oran R. *The Institutional Dimensions of Environmental Change.* Cambridge, Mass.: The MIT Press, 2002.